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MAY 2002

ENVIRONMENTAL ASSESSMENT

BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT DADE COUNTY, FLORIDA

SECOND PERIODIC RENOURISHMENT AT HAULOVER BEACH PARK



**U.S. Army Corps
of Engineers**
Jacksonville District



REPLY TO
ATTENTION OF

**DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019**

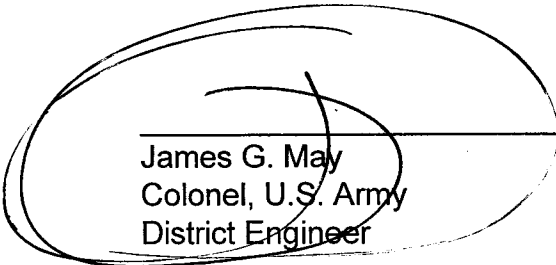
**FINDING OF NO SIGNIFICANT IMPACT
SECOND PERIODIC RENOURISHMENT
AT HAULOVER BEACH PARK
BEACH EROSION CONTROL AND
HURRICANE PROTECTION PROJECT
DADE COUNTY, FLORIDA**

I have reviewed the Environmental Assessment (EA) for the proposed action. This Finding incorporates by reference all discussions and conclusions contained in the Environmental Assessment enclosed hereto. Based on information analyzed in the EA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

- a. The proposed action would restore a section of severely eroded beach at Haulover Beach Park in Dade County, Florida thus preventing or reducing loss of public beachfront to continuing erosional forces and preventing or reducing periodic damages and potential risk to life, health and property in the developed lands adjacent to the beach.
- b. Measures to prevent or minimize impacts to sea turtles in accordance with Biological Opinions from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service will be implemented during and after project construction. To protect the manatee, all water-based activities would follow standard manatee protection measures. There would be no adverse impacts to other Federally listed endangered or threatened species.
- c. Based on historic property field investigations, no potentially significant cultural resources are located in the proposed offshore borrow area. No significant historical properties have been identified on the segment of beach proposed for renourishment.
- d. The Florida Department of Environmental Protection on July 27, 2001 issued Water Quality Certification (Permit No. 0128781-001-JC), pursuant to Section 401 of the Clean Water Act. With issuance of the WCQ the project is consistent with the Florida Coastal Zone Management Program.

e. Measures to eliminate, reduce, or avoid potential impacts to fish and wildlife resources include the following: (1) A buffer zone with a minimum distance of 400 feet from any hardbottom has been established for the proposed borrow area, (2) Visual inspections of hardbottom in proximity to the dredging area would be routinely conducted to look for any indicators of turbidity, sedimentation or mechanical impacts, (3) Extensive turbidity monitoring would be performed at the beach fill and dredging sites during construction to ensure turbidity levels do not exceed the State water quality standard, (4) To avoid mechanical damage to hardbottom habitat associated with dredging, precision electronic positioning equipment would be used to ensure the dredge remains in the borrow area during dredging operations.

98 JUNE 02
Date


James G. May
Colonel, U.S. Army
District Engineer

**ENVIRONMENTAL ASSESSMENT
ON
SECOND PERIODIC RENOURISHMENT
AT HAULOVER BEACH PARK
BEACH EROSION CONTROL AND
HURRICANE PROTECTION PROJECT
DADE COUNTY, FLORIDA**

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ENVIRONMENTAL ASSESSMENT ON SECOND PERIODIC RENOURISHMENT AT HAULOVER BEACH PARK BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT DADE COUNTY, FLORIDA

1. PROJECT PURPOSE AND NEED

1.1 PROJECT AUTHORITY.

1.1.1 INITIAL AUTHORIZATION.

The Beach Erosion Control and Hurricane Protection (BEC & HP) Project for Dade County, Florida was authorized by the Flood Control Act of 1968. In addition, Section 69 of the 1974 Water Resources Act (P. L. 93-251 dated 7 march 1974) included the initial construction by non-federal interests of the 0.85 mile segment along Bal Harbour Village, immediately south of Bakers Haulover Inlet. The authorized project, as described in HD 335/90/2, provided for the construction of a protective/recreational beach and a protective dune for 9.3 miles of shoreline between Government Cut and Baker's Haulover Inlet (encompassing Miami Beach, Surfside and Bal Harbour) and for the construction of a protective/recreational beach along the 1.2 miles of shoreline at Haulover Beach Park.

1.1.2 SUPPLEMENTAL APPROPRIATION.

The Supplemental Appropriations Act of 1985 and the Water Resources Development Act of 1986 (Public Law 99-662) provided authority for extending the northern limit of the authorized project to include the construction of a protective beach along the 2.5 mile reach of shoreline north of Haulover Beach Park (Sunny Isles) and for periodic nourishment of the new beach. This authority also provided for the extension of the period of Federal participation in the cost of nourishing the authorized 1968 BEC & HP Project for Dade County, which covered 10.5 miles of shoreline extending from Government Cut north to the northern boundary of Haulover Beach Park, from 10 years to the 50-year life of the project.

1.2 PROJECT LOCATION.

The project is located on the southeast Florida coast within Dade County. Haulover Beach Park is a public park located immediately north of Bakers Haulover Inlet (see figure 1, project location map).

1.3 PROJECT NEED OR OPPORTUNITY.

Nourishment of Dade County Beaches has become a necessity to provide storm protection. The purpose

of the project is to reduce loss of public beach front to continuing erosional forces and to prevent or reduce periodic damages and potential risk to life, health, and property in the developed lands adjacent to the beach. Continual erosion of the beach has resulted in the loss of nesting habitat for threatened and endangered sea turtles loss of protection from storm and hurricane damage and potential risk to life, health, and property. Recent storm impacts to the project (Hurricane Andrew in 1992, Hurricane Gordon in 1994, and the winter storms in 1996) have severely increased the need for the project.

1.4 DESCRIPTION OF PROPOSED ACTION

The placement of about 114,000 cubic yards of material will be required along the beach at Haulover Beach Park, Dade County, Florida. The beach fill would extend southward from the border with Sunny Isles, approximately 2,600 feet. Refer to figure 2 for a plan view of the fill area. The construction berm width is 120 feet from the ECL at an elevation of +9 feet mean low water (MLW), with a construction tolerance of +/- 0.5 feet. The front slope of the fill will be 1 vertical on 10 horizontal. Refer to figure 3 for a typical profile view. The proposed borrow area is located within the ebb shoal northeast of Bakers Haulover Inlet in 10 to 20 feet of water (figures 1 & 4).

1.5 RELATED ENVIRONMENTAL DOCUMENTS.

The following is a list of related documents:

- a. Dade County Beaches, Florida, Beach Erosion Control and Hurricane Surge Protection, General Design Memorandum, Phase I. U.S. Army Corps of Engineers, Jacksonville District, 1974.
- b. Final Environmental Impact Statement, Beach Erosion Control and Hurricane Surge Protection Project, Dade County, Florida. U.S. Army Corps of Engineers, Jacksonville District, April 1975.
- c. Beach Erosion Control and Hurricane Protection Study for Dade County, Florida, North of Haulover Beach Park, Survey Report and EIS Supplement. U.S. Army Corps of Engineers, Jacksonville District, June 1984.
- d. Final Environmental Assessment, Second Periodic Nourishment, Sunny Isles and Miami Beach

Segments, Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. U.S. Army Corps of Engineers, Jacksonville District, May 1995.

e. Coast of Florida Erosion and Storm Effects Study, Region III, Feasibility Report with Final Environmental Impact Statement. U.S. Army Corps of Engineers, Jacksonville District, October 1996.

f. Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Second Periodic Nourishment, Surfside and South Miami Beach Segments. U.S. Army Corps of Engineers, Jacksonville District, April 1997.

g. Dade County, Florida, Shore Protection Project, Design Memorandum, Addendum III, North of Haulover Park (Sunny Isles) Segment, U.S. Army Corps of Engineers, Jacksonville District, January 1995.

h. Final Environmental Assessment Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Second Periodic Nourishment, at Bal Harbour. U.S. Army Corps of Engineers, Jacksonville District, May 1998.

i. Final Environmental Impact Statement, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Modifications at Sunny Isles. U.S. Army Corps of Engineers, Jacksonville District, May 1998.

j. Final Environmental Assessment, Beach Erosion Control and Hurricane Protection Project Dade County, Florida, Renourishment at Miami Beach in the Vicinity of 63rd Street. U.S. Army Corps of Engineers, Jacksonville District, November 2000.

1.6 DECISIONS TO BE MADE.

The alternatives to provide shore protection for Dade County beaches, from Government Cut north to Bakers Haulover Inlet (including Haulover Beach Park), were evaluated in references 1.5a and 1.5b above. The plan recommended and approved for implementation was beach restoration with periodic renourishment. This Environmental Assessment will not re-evaluate the alternatives to beach renourishment but, will evaluate alternative sand sources to accomplish the renourishment at Haulover Beach Park.

1.7 SCOPING AND ISSUES.

Scoping for the proposed action was initiated by a Public Notice dated February 3, 2000. The Public Notice was distributed to the appropriate Federal, State and Local agencies, appropriate city and county officials, and other parties known to be interested in the project. Copies of the Public Notice, the list of addressees used to distribute the notice, and letters of response are included in Appendix C, Pertinent Correspondence.

1.7.1 ISSUES EVALUATED IN DETAIL.

The following issues were identified during scoping and by the preparers of this Environmental Assessment to be relevant to the proposed action and appropriate for detailed evaluation:

- a. Turbidity and sedimentation impacts to hardground/reef communities.
- b. Monitoring of reefs adjacent to the borrow area for turbidity and sedimentation impacts.
- c. Impacts on nesting sea turtles, nests, and hatchlings.
- d. Mitigation.
- e. Impacts on historic properties (i.e. historic shipwrecks).
- f. Water quality.
- g. Recreation.
- h. Endangered Species

1.7.2 IMPACT MEASUREMENT.

The following provides the means and rationale for measurement and comparison of impacts of the proposed action and alternatives.

1.7.2.1 Hardground and Reef Impacts.

Based on extensive experience with beach renourishment and use of off-shore borrow in Dade County and other Florida beaches, impacts to hardground and reefs can be predicted based on proximity, currents, nature of borrow material, buffer zones and other factors. Our desire in selecting an alternative is to keep impacts to these resources to the minimum practicable in consideration of other project requirements.

1.7.2.2 Sea Turtles.

Sea Turtle nesting is closely monitored along Dade County's public beaches, including Haulover Beach Park. Detected nests are relocated to a safe hatchery. Impacts of compaction and scarps are fairly well established. In addition, continued beach erosion would reduce available nesting habitat. Corrective and mitigative protocols have been established. It is our goal to minimize impacts to sea turtles and to comply with the requirements of the Endangered Species Act.

1.7.2.3 Other Impacts.

Bases for impact measurement and comparison are stated more specifically in section 4.0 on ENVIRONMENTAL EFFECTS and other sections of this document and its appendices.

1.7.3 ISSUES ELIMINATED FROM DETAIL ANALYSIS.

No issues were specifically identified for elimination.

1.8 PERMITS, LICENSES, AND ENTITLEMENTS.

The proposed beach renourishment is subject to the Coastal Zone Management Act. Consultation with the State Historic Preservation Officer is also required. Since there would be a discharge of dredged or fill material into waters of the United States, the proposed Action is subject to Section 404 of the Clean Water Act. In addition the proposed action is subject to Section 401 of the Act for certification of water quality by the state. The Florida Department of Environmental Protection (FDEP) has

issue a Water Quality Certification (Permit No. 0128781-00-JC) for this project.

If conducted during the sea turtle nesting and hatching season, the proposed action will require daily sea turtle nest surveys and nest relocations. A permit from the Florida Fish and Wildlife Conservation Commission (FWC) to handle sea turtles and relocate nests will be required for the person(s) performing the surveys and nest relocations associated with the proposed action. For

the proposed renourishment at Haulover Beach Park, personnel from the Dade County Department of Parks and Recreation will be conducting the surveys and nest relocations.

The project sponsor, Dade County Department of Environmental Resources Management (DERM), is responsible for obtaining any real estate easements and rights of way required for this project.

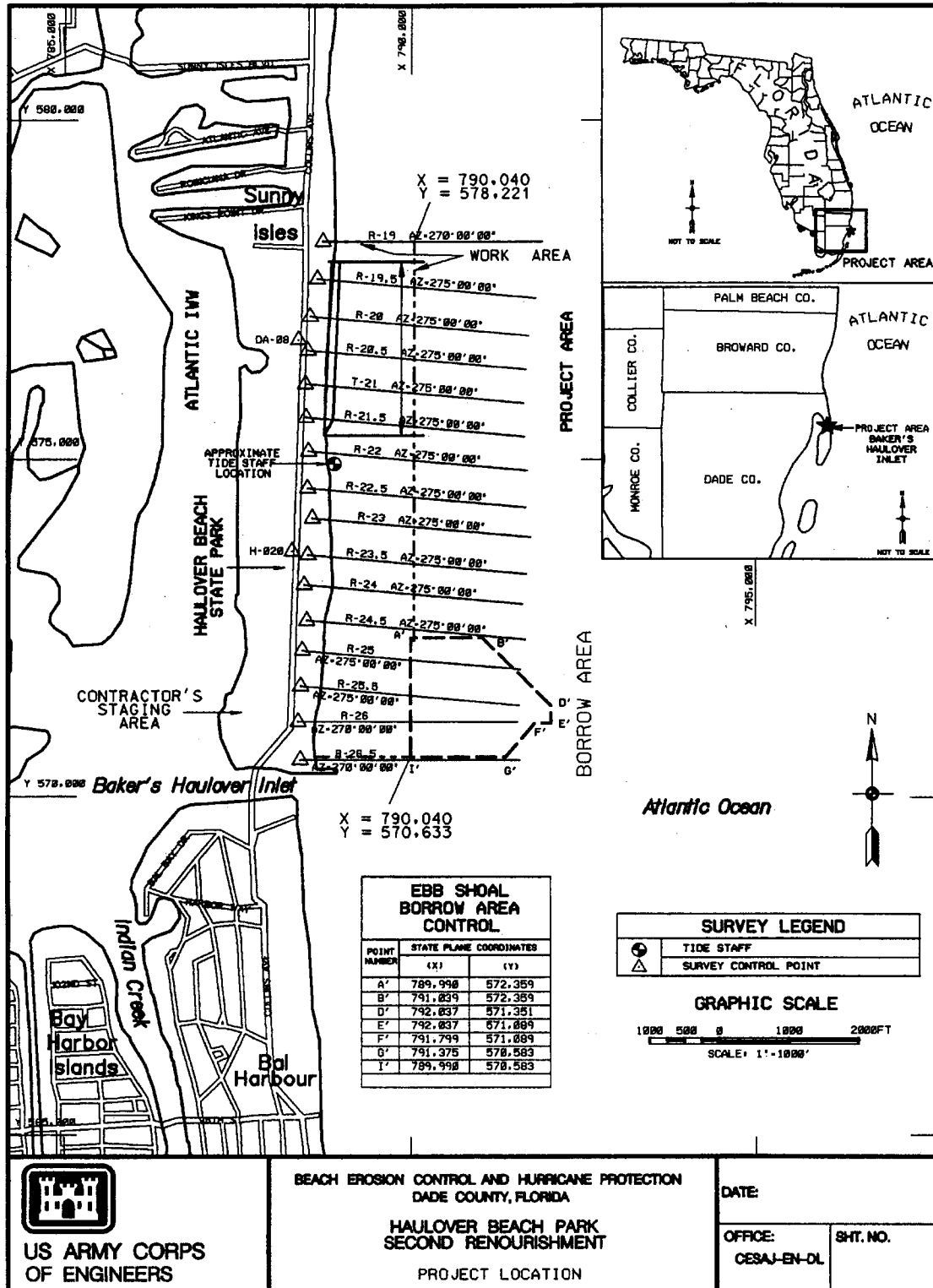


Figure 1. Project Location Map

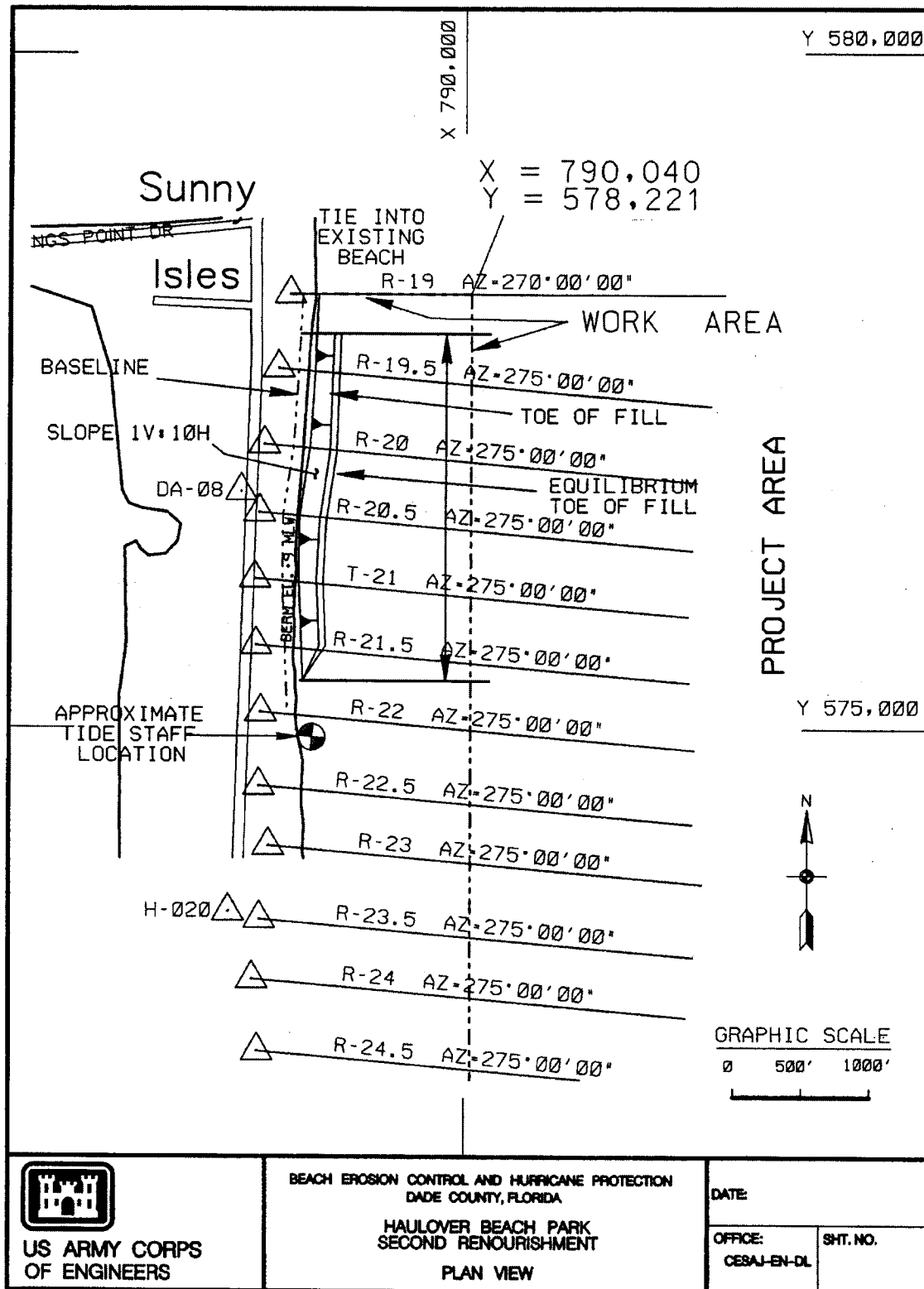
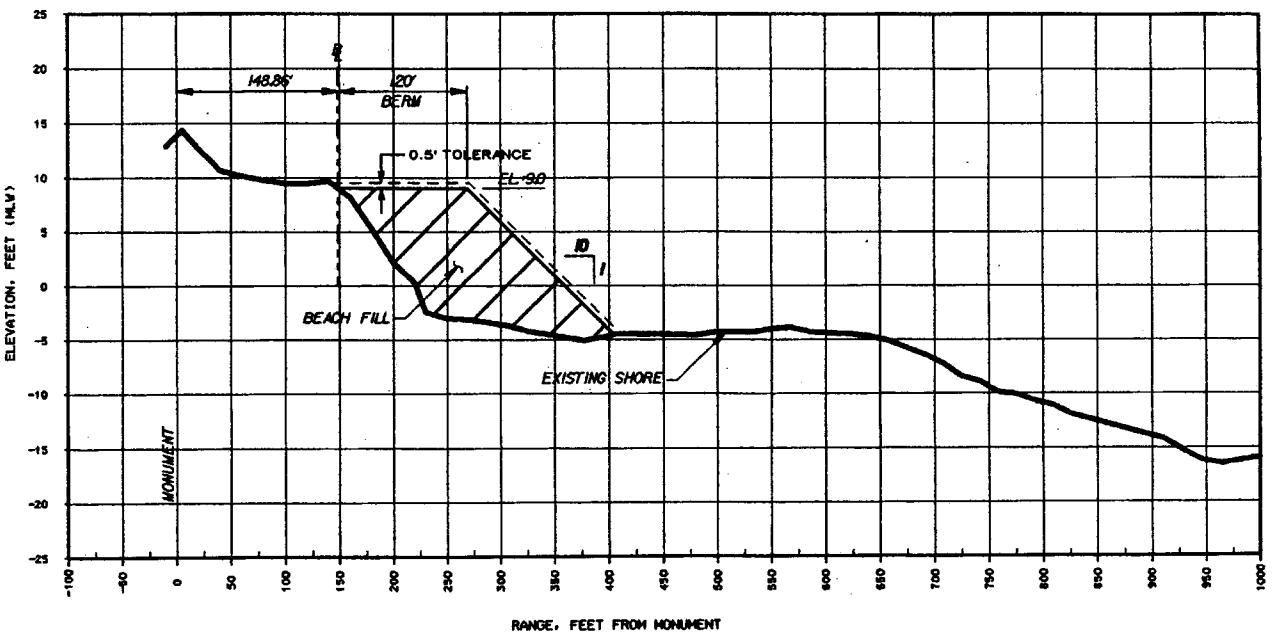


Figure 2. Plan view of the beach fill area.



PROFILE R-19.5

GRAPHIC SCALES



**US ARMY CORPS
OF ENGINEERS**

**BEACH EROSION CONTROL AND HURRICANE PROTECTION
DADE COUNTY, FLORIDA
HAULOVER BEACH PARK
SECOND RENOVISHMENT
TYPICAL PROFILE**

DATE:

OFFICE:
CEBA-BH-DL

SHT. NO.

Figure 3. Typical beach fill profile view.

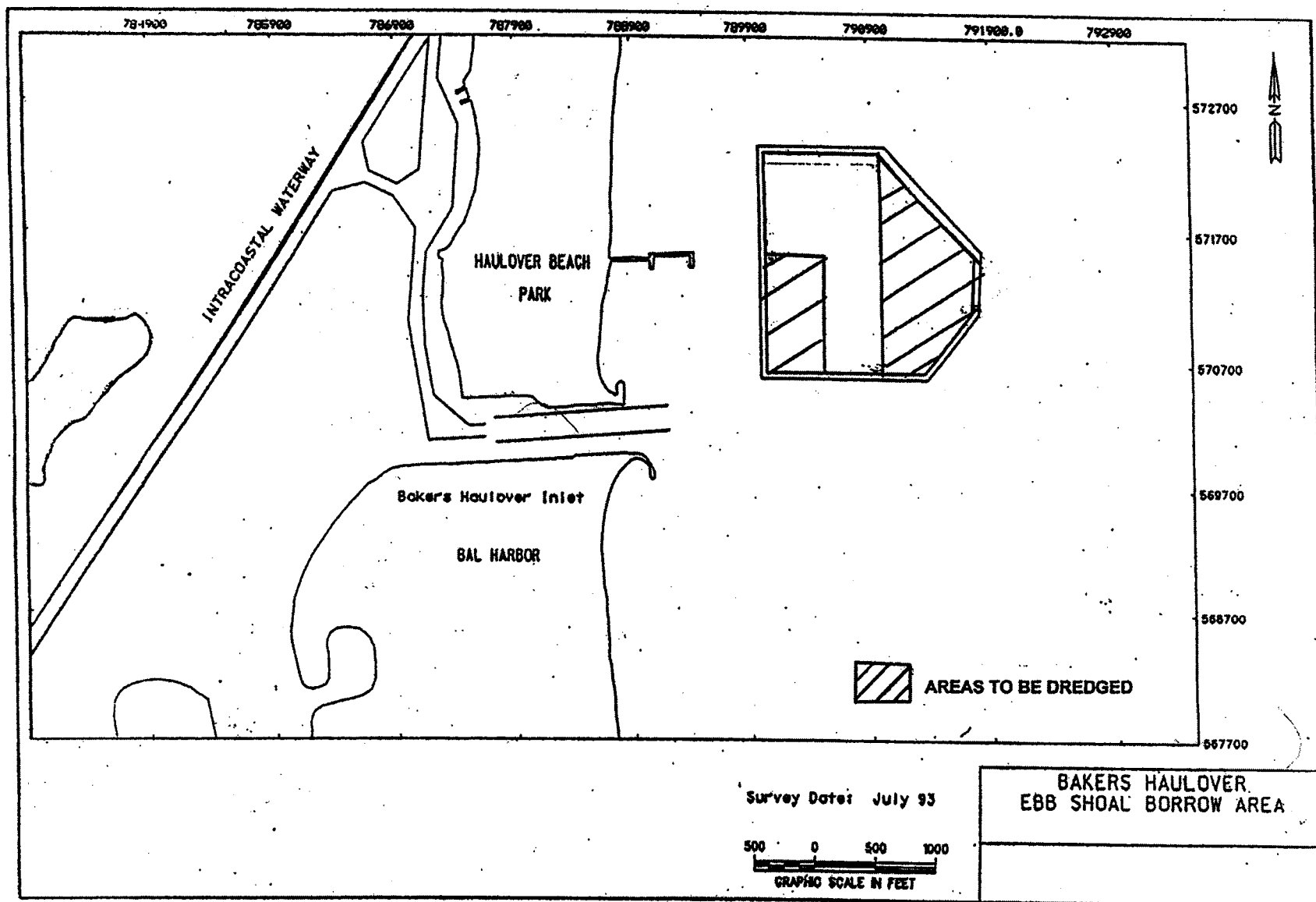


Figure 4. Proposed Borrow Area, Ebb Shoal at Bakers Haulover Inlet

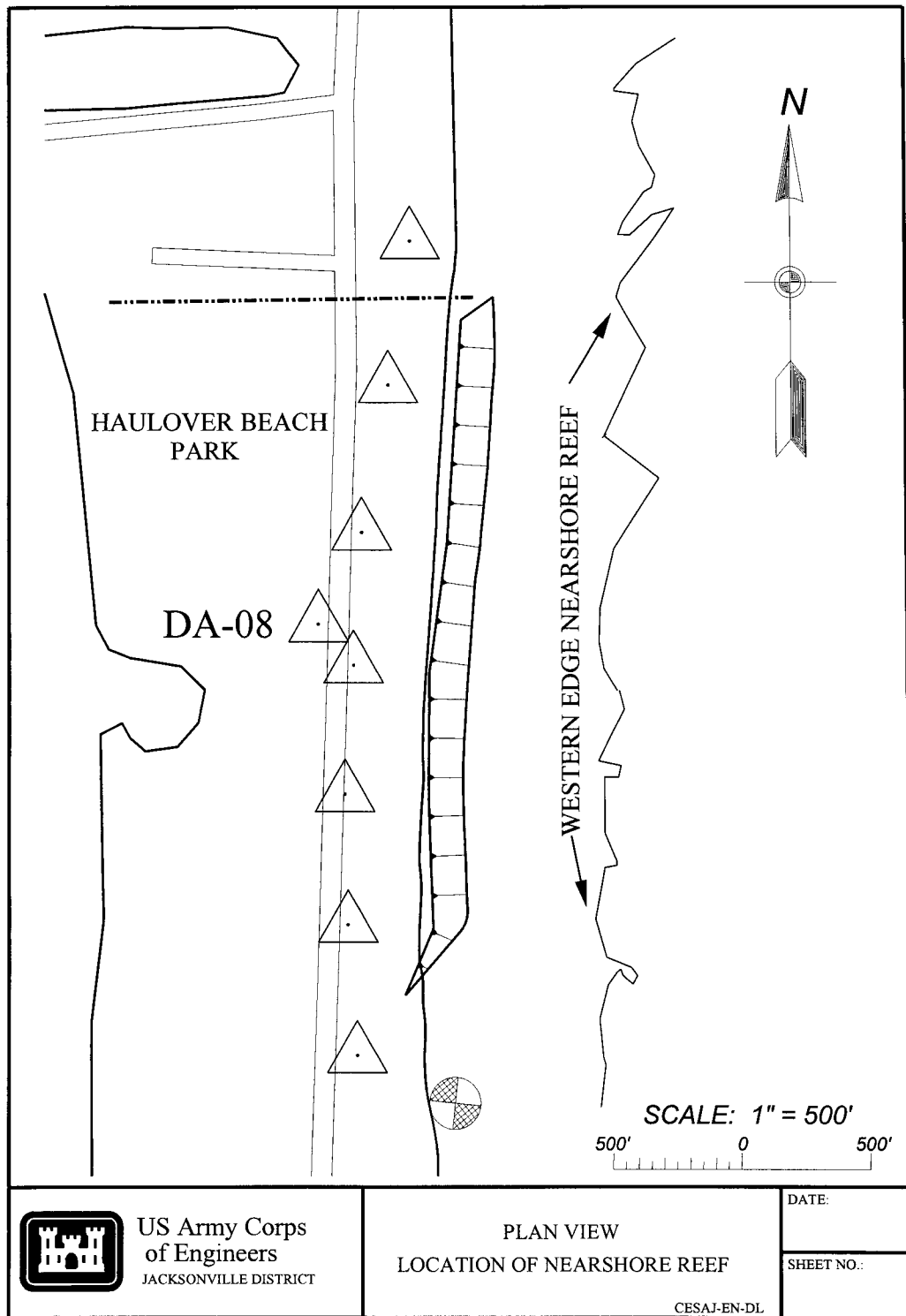


Figure 5. Location of the western edge of the nearshore reef.

2. ALTERNATIVES

The alternatives section is the heart of this EA. This section describes in detail the no-action alternative, the proposed action, and other reasonable alternatives that were studied in detail. Then based on the information and analysis presented in the sections on the Affected Environment and the Probable Impacts, this section presents the beneficial and adverse environmental effects of all alternatives in comparative form, providing a clear basis for choice among the options for the decisionmaker and the public.

As previously mentioned in Section 1.6, the alternatives to provide shore protection for Dade County beaches were evaluated in prior reports. The plan recommended and approved for implementation was beach restoration with periodic renourishment. This Environmental Assessment will not re-evaluate alternatives to beach renourishment but, will evaluate alternatives to accomplish renourishment at Haulover Beach Park.

2.1 DESCRIPTION OF ALTERNATIVES.

2.1.1 PROPOSED BORROW AREA - EBB SHOAL AT BAKERS HAULOVER

The proposed borrow area for this renourishment is the ebb shoal at Bakers Haulover Inlet. The area is located approximately 2,000 feet offshore, and just northeast of the inlet in 10 to 20 feet of water (figure 4). The borrow area occupies about half of the ebb shoal. The final design was selected to leave a shoal and resulting wave refraction to minimize the impact to the adjacent shore processes.

The material to be excavated is generally light gray to tan, poorly graded shelly sand with a trace of silt and gravel sized shell fragments. The composite mean grain size of the borrow area is 0.54 mm. Silt content ranges from 0.2 to 13.3 percent with an average of 2.7 percent. Large carbonate rock fragments do not occur in the borrow area; therefore, rock removal will not be required. More detail Geotechnical information on the sand source can be found in Appendix D. No hardbottom areas are located within the borrow area, and no hardbottoms occur within 400 feet of the eastern tip of the borrow area.

The water depth within the proposed ebb shoal borrow area is too shallow for a hopper dredge. The most likely piece of equipment to be used would be a hydraulic pipeline dredge. A submerged pipeline would be placed from the borrow area to the shore to transfer material from the dredge to the beach.

2.1.2 BORROW AREAS SOUTH OF GOVERNMENT CUT

Several borrow areas south of Government Cut have been developed for the renourishment of the Dade County BEC&HP Project. All but one of these borrow areas have been used for previous renourishments of the project. The remaining borrow area has been designated as SGC-EXT-2 and is located about 2 miles east of Key Biscayne. The borrow area is in 35 to 45 feet of water and is situated between two

hardground/reef communities. To protect reef communities the borrow area has been designed to have a buffer zone of at least 400 feet from any hardground area. The borrow area has also been designed to avoid potentially significant cultural resources identified in the vicinity. Sand from this area is generally light gray, poorly graded carbonate sand with a trace of silt and gravel sized shell fragments. Silt content in the borrow area ranges from 0.8 to 9.2 percent with an average of 3.7 percent. The composite mean grain size is 0.62 mm. Carbonate rock fragments occur within the borrow area and it is estimated that up to 5 percent of the borrow area may be rock fragments from 1 inch to 3 feet in diameter. The use of this borrow area will require that all rock fragments larger than 1 inch be separated from the sand and disposed of in an approved area offshore. The borrow area is a high quality beach nourishment sand source that contains a low amount of silt.

One disadvantage of using the SGC-EXT-2 borrow area when compared to the proposed borrow area is the hauling distance. The distance from the SGC-EXT-2 borrow area to Haulover Beach Park ranges from 12 to 16 miles. This is considerably greater than the distance to the ebb shoal borrow area, which is about 2,000 feet.

2.1.3 DISTANT DOMESTIC SAND SOURCES

Non-local offshore sources of sand (sand located outside the immediate Dade County area) are discussed here as an alternative to the proposed borrow area. This sand could come from other areas within Florida or perhaps outside the state. According to investigations conducted during of the Coast of Florida Erosion and Storm Effects Study, Region III, a substantial amount of sand lies off the coast of Palm Beach County (estimated at 655,025,947 cubic yards). The renourishment needs of the Palm Beach County Shore Protection Project is estimated at 26,253,000 cubic yards of material over the next 50 years [except the Delray segment (28 years) and Boca Raton segment (43 years)]. Although the use of distant sources causes an increase to project costs, the inadequate supply of sand in Dade County will result in the use of alternate sources in the future. However, Palm Beach County has objected to the use of sediment deposits offshore of Palm Beach County for beach nourishment projects in Dade County. Refer to letter dated 25 April 1995, from the Director of the Department of

Environmental Resources Management for Palm Beach County in Appendix C.

2.1.4 UPLAND SAND SOURCE

Test results on native beach materials and sands available from commercial upland sand quarries indicate that, in most cases, the upland sand sources are texturally very compatible with little or no overfill required. Upland sand quarries are located on the Lake Wales Ridge of the Central Highlands physiographic region of south Florida. One upland source area is located southwest of Lake Okeechobee, at Ortona, Florida. There are presently two quarries at Ortona, and barge canal access to the Okeechobee Waterway is accessible to both quarries. The material from these two quarries consists of clean, medium to fine grained quartz sand that have a mean grain size range of 0.48 mm to 0.55 mm with generally less than 5 percent silt content. This alternative would involve the transporting sand from a quarry site, by either barge or railroad cars, to an appropriate offloading site near the project location. The sand would then be loaded onto dump trucks and then hauled to the beach and dumped at beach access points along the fill site. From these beach stockpiles, the material would be distributed along the beach by earthmoving equipment. Because of the potential to damage bridges, the dump trucks would most likely be limited to a maximum capacity of 12 cubic yards. With an estimated volume of 114,000 cubic yards of sand needed to complete the project, this would require over 9,500 truckloads. The use of larger dump trucks (i.e. 16 to 18 cubic yards), if allowed, would reduce the number of loads but would still be substantial. This would have a significant adverse impact on the traffic within the project area and areas adjacent to the project. There would also be an

increase in the noise levels associated with trucking sand to the project site. In addition, vibrations caused by the trucks could damage structures that are located close to the roadways being used. The use of large numbers of trucks would also cause extensive damage to the roads used. This would require that the roads be repaired after construction has been completed.

2.1.5 NO ACTION ALTERNATIVE (STATUS QUO)

If the no action alternative is implemented, the present condition of erosion along the shoreline at Haulover Beach Park would continue at its present rate. The no action alternative does not provide the benefits needed to protect the coast from the effects of erosion and storm damage.

2.2 COMPARISON OF ALTERNATIVES

Table 1 lists the alternatives considered and summarizes the major features and consequences of the proposed action and alternatives. See section 4.0 Environmental Effects for a more detailed discussion of impacts of alternatives.

2.3 MITIGATION

Borrow area design will ensure sufficient buffer areas to minimize impacts from turbidity, sedimentation and mechanical damage on nearshore hardbottom communities. The eastern edge of the ebb shoal borrow area is located no closer than 400 feet from the shoreward edge of the nearshore hardbottom habitat. Precision positioning of equipment, with a Geographic Positioning System (GPS), will aid in avoiding sensitive areas. Section 5.0 Environmental Commitments, discusses other procedures that will be implemented to avoid or minimize potentially adverse environmental impacts.

Table 1: Summary of Direct and Indirect Impacts for Alternatives Considered.

ALTERNATIVE ENVIRONMENTAL FACTOR	PROPOSED EBB SHOAL BORROW AREA	BORROW AREAS SOUTH OF GOVERNMENT CUT	DISTANT DOMESTIC SAND SOURCES	UPLAND SAND SOURCES	NO ACTION
PROTECTED SPECIES	no impact on manatees , whales, or sea turtles at borrow area; beach fill could impact sea turtle nesting or hatching.	no impact on manatees , whales, or sea turtles at borrow area; beach fill could impact sea turtle nesting or hatching.	no impact on manatees , whales, or sea turtles at borrow area; beach fill could impact sea turtle nesting or hatching.	potential impact to sea turtle nesting and hatching; potential to effect scrub jay and gopher tortoise habitat.	continued erosion could affect sea turtle nesting habitat.
HARD GROUND	potential sedimentation, turbidity and mechanical effects near borrow area	potential sedimentation, turbidity and mechanical effects near borrow areas; impacts to hardgrounds from pipeline placement.	potential sedimentation, turbidity and mechanical effects near borrow areas; impacts to hardgrounds from pipeline placement.	no impact if sand is truck hauled to beach; if trans- ported by barge and pumped to beach, potential impact from pipeline placement.	no impact
EFFECTS ON ADJACENT SHORELINE EROSION	use of borrow area is not expected to increase crosion on adjacent shoreline.	no effect expected	no effect	no effect	continued erosion of the project beach.
FISH AND WILDLIFE RESOURCES	minor affect on benthic organisms at beach and borrow sites - beach habitat improved.	minor affect on benthic organisms at beach and borrow sites - beach habitat improved.	minor affect on benthic organisms at beach and borrow sites - beach habitat improved.	depends on wildlife present at quarry - minimal impact is expected; beach habitat improved.	continued loss of beach habitat
VEGETATION	no seagrass beds present in borrow area; no impact.	no seagrass beds present in borrow area; no impact.	unknown at this time; could impact seagrasses if present in vicinity of borrow area.	no impact to seagrasses; upland vegetation may be affected - extent unknown.	continued erosion could impact dune vegetation.
WATER QUALITY	temporary increase in turbidity and suspended sediments at borrow and beach fill sites.	temporary increase in turbidity and suspended sediments at borrow and beach fill sites.	temporary increase in turbidity and suspended sediments at borrow and beach fill sites.	temporary increase in turbidity and suspended sediments at beach site.	no impact
HISTORIC PROPERTIES	no impact expected	no impact expected	not determined	no impact expected	no impact
ECONOMICS	uses nearby economical sand source	higher costs in comparison due to mobilization of hopper dredge and longer transporting distances.	higher costs in comparison due to mobilization of hopper dredge and longer transporting distances.	higher transportation costs; increased maintenance costs on roads used to transport sand.	beach degradation with potential decrease in tourism.

ALTERNATIVE ENVIRONMENTAL FACTOR	PROPOSED EBB SHOAL BORROW AREA	BORROW AREAS SOUTH OF GOVERNMENT CUT	DISTANT DOMESTIC SAND SOURCES	UPLAND SAND SOURCES	NO ACTION
ENERGY REQUIREMENTS & CONSERVATION	smaller energy use in comparison with other alternatives.	higher in comparison to proposed borrow area due to longer transporting distances.	higher in comparison to proposed borrow area due to longer transporting distances.	higher in comparison to proposed borrow area due to longer transporting distances.	potentially higher energy usage during storm damage clean up.

Table 1 (Continued): Summary of Direct and Indirect Impacts for Alternatives Considered.

3. AFFECTED ENVIRONMENT

The Affected Environment section succinctly describes the existing environmental resources of the areas that would be affected if any of the alternatives were implemented. This section describes only those environmental resources that are relevant to the decision to be made. It does not describe the entire existing environment, but only those environmental resources that would affect or that would be affected by the alternatives if they were implemented. This section, in conjunction with the description of the "no-action" alternative forms the base line conditions for determining the environmental impacts of the proposed action and reasonable alternatives.

3.1 VEGETATION

The dominant plant species within the dune system at Haulover Beach Park include sea grapes, *Coccoloba uvifera*; the beach morning glory, *Ipomoea pes-caprea*; beach bean, *Canavalia rosea*; sea oats, *Uniola paniculata*; dune panic grass, *Panicum amarulum*; bay bean, *Canavalia maritima*. The beach berry or inkberry, *Scaevola plumieri*; sea lavender, *Mallotonia gnaphalodes*; spider lily, *Hymenocallis latifolia*; beach star, *Remirea maritima*; and coconut palm, *Coco nucifera* are also present

Algal coverage on the offshore hardground areas fluctuates seasonally. The most common algal species observed within southeast Florida offshore hardground areas are *Caulerpa prolifera*, *Codium isthmocladum*, *Gracillaria* sp., *Udotea* sp., *Halimeda* sp., and various members of the crustose coralline algae of the family Corallinaceae. Algal growth is most luxuriant from late July through late October or early November, and there seems to be a particular burst or bloom in the macroalgal population in conjunction with the seasonal upwelling that occurs in late July or early August (Smith, 1981, 1983; Florida Atlantic University and Continental Shelf Associates, Inc., 1994).

Seasonally, there is extensive macroalgal growth in the offshore soft bottom areas, with species of green algae (*Caulerpa* sp., *Halimeda* sp., and *Codium* sp.) being particularly abundant in the summer and the brown algal species (*Dictyota* sp. and *Sargassum* sp.) being more abundant in the winter (Courtenay et al., 1974; Florida Atlantic University and Continental Shelf Associates, Inc., 1994). The sea grass *Halophila decipiens* has been observed offshore of Dade County, but is considered seasonal (April through November) in these offshore soft bottom areas.

3.2 THREATENED AND ENDANGERED SPECIES

3.2.1 SEA TURTLES

Sea turtles are present in the open ocean year-round offshore of Dade County because of warm water temperatures and hardbottom habitat used for both foraging and shelter. The predominant species is the loggerhead sea turtle, *Caretta caretta*, although green turtles, *Chelonia mydas*; leatherback turtles, *Dermochelys coriacea*; hawksbill turtles, *Eretmochelys imbricata*; and Kemp's ridleys, *Lepidochelys kempii* are also known to exist in the

area. All the sea turtles except for the loggerhead are listed as endangered. The loggerhead is listed as threatened.

Sea turtle nesting in Dade County occurs from May through September (Meylan et. al., 1995). The density of nesting along the Dade County shoreline north of Government Cut is relatively low. The loggerhead accounts for the majority of the nesting in the county with occasional nesting by green and leatherback turtles. Leatherback turtles may start nesting earlier than loggerheads. In Dade County the earliest nest documented by Meylan et. al., 1995 was on April 11, 1992. During the sea turtle nesting season, the Dade County Park and Recreation Department conducts daily surveys and relocates nests found along the beach from Sunny Isles south to Government Cut. This is done to prevent poaching or nest destruction due to beach maintenance, emergency vehicles which access the beach and other human related causes (Flynn 1992). All nests found during the surveys are relocated to a central hatchery on Miami Beach (pers. comm., B. Flynn, Dade Co. Dept. of Env. Res. Mgmt., 1993).

3.2.2 WEST INDIAN MANATEE

The estuarine waters around the inlets and bays within Dade County provide year-round habitat for the West Indian manatee, *Trichechus manatus*. Although manatees have been observed in the open ocean, they feed and reside mainly in the estuarine areas and around inlets. No significant foraging habitat is known to exist in the areas around the project sites, nor have manatees been known to congregate in the nearshore environment within the project area.

3.2.3 OTHER THREATENED ENDANGERED SPECIES

Other threatened or endangered species that may be found in the in the coastal waters off of Dade County during certain times of the year are the finback whale, *Balaenoptera physalus*; humpback whale, *Megaptera novaeangliae*; right whale *Eubalaena glacialis*; sei whale, *Balaenoptera borealis*; and the sperm whale *Physeter macrocephalus catodon*. These are infrequent visitors to the area and are not likely to be impacted by project activities.

3.3 FISH AND WILDLIFE RESOURCES

3.3.1 BEACH AND OFFSHORE SAND BOTTOM COMMUNITIES

The beaches of southeast Florida are exposed beaches and receive the full impact of wind and wave

action. Intertidal beaches usually have low species richness, but the species that can survive in this high energy environment are abundant. The upper portion of the beach, or subterrestrial fringe, is dominated by various talitrid amphipods and the ghost crab *Ocypode quadrata*. In the midlittoral zone (beach face of the foreshore), polychaetes, isopods, and haustoriid amphipods become dominant forms. In the swash or surf zone, beach fauna is typically dominated by coquina clams of the genus *Donax*, the mole crab *Emerita talpoida*. All these invertebrates are highly specialized for life in this type of environment (Spring, 1981; Nelson, 1985; and U.S. Fish and Wildlife Service [USFWS], 1997).

Shallow subtidal soft bottom habitats (0 to 1 meters [0 to 3 feet] depth) show an increasing species richness and are dominated by a relatively even mix of polychaetes (primarily spionids), gastropods (*Oliva* sp., *Terebra* sp.), portunid crabs (*Arenaeus* sp., *Callinectes* sp., *Ovalipes* sp.), and burrowing shrimp (*Callinassa* sp.). In slightly deeper water (1 to 3 meters [3 to 10 feet] depth) the fauna is dominated by polychaetes, haustoid and other amphipod groups, bivalves such as *Donax* sp. and *Tellina* sp. (Marsh *et al.*, 1980; Goldberg *et al.*, 1985; Gorzelany and Nelson, 1987; Nelson, 1985; Dodge *et al.*, 1991).

Offshore soft bottom communities are less subject to wave-related stress than are nearshore soft bottom communities. They exhibit a greater numerical dominance by polychaetes as well as an overall greater species richness than their nearshore counterparts. Barry A. Vittor & Associates, Inc. (1984) reported polychaetes made up 68.9 percent of the macrobenthic community off Port Everglades, followed by mollusca (13.2 percent), arthropods (10.7 percent), echinoderms (1.2 percent), and miscellaneous other groups (6.0 percent). Goldberg (1985) reported polychaetes as the dominant taxon from his infaunal survey off northern Broward County. Dodge *et al.* (1991) found polychaetes to be the most abundant group in 18 meters (60 feet) of water off Hollywood, Florida. In March 1989, polychaetes made up 51.7 percent of the macrofaunal community at that location followed by nematodes (14.3 percent), smaller species of crustaceans (9.0 percent), oligochaetes (4.3 percent), nemerteans (3.6 percent), and bivalves (2.9 percent).

Larger members of the invertebrate macrofauna seen occasionally in these offshore soft bottom areas between the second and third reef lines include the queen helmet, *Cassia madagascariensis*; the king helmet, *Cassia tuberosa*; Florida fighting conch, *Strombus alatus*; milk conch, *Strombus costatus*; queen conch, *Strombus gigas*; Florida spiny jewel box, *Arcinella cornuta*; decussate bittersweet, *Glycymeris decussata*; calico clam, *Macrocallista maculata*; tellin, *Tellina* sp.; and cushion star, *Oreaster reticulatus*. Commercially valuable species, such as the Florida lobster, *Panulirus argus* move through this area as they migrate from offshore to nearshore areas (Courtenay *et al.*, 1974).

Surf zone fish communities are typically dominated by relatively few species (Modde and Ross, 1981; Peters and Nelson, 1987). Fish species that can be found in the surf zone include, Atlantic threadfin herring, *Opisthonema oglinum*; blue runner, *Caranx crysos*; spotfin mojarra, *Eucinostomus argenteus*; southern stingray, *Dasyatis americana*; greater barracuda, *Sphyrna barracuda*; yellow jack, *Caranx bartholomaei*; and the ocean triggerfish, *Canthidermis sufflamen*, none of which are of local commercial value. Most of the fish making up the inshore surf community tend to be either small species or juveniles (Modde, 1980).

Fish species specifically associated with the sand flats and soft bottom areas between the first and second reefs off Dade county include lizardfish, *Synodus* sp.; sand tilefish, *Malacanthus plumieri*; yellow goatfish, *Mulloidichthys martinicus*; spotted goatfish, *Pseudupeneus maculatus*; jawfish, *Opistognathus* sp.; stargazer, *Platygillicellus* (*Gillellus*) *rubrocinctus*; flounder, *Bothus* sp.; and various species of gobies and blennies, none of which have significant local commercial value.

3.3.2 REEF/HARDGROUND COMMUNITIES

The classic reef distribution pattern described for southeast Florida reefs north of Key Biscayne consists of an inner reef in approximately 15 to 25 foot (5 to 8 meters) of water, a middle patch reef zone in about 30 to 50 foot (9 to 15 meters) of water, and an outer reef in approximately 60 to 100 foot (18 to 30 meters) of water. This general description was first published by Duane and Meisburger (1969) and has been the basis for most descriptions of hardground areas north of Government Cut, Miami since that time (Goldberg, 1973; Courtenay *et al.*, 1974; Lighty *et al.*, 1978; Jaap, 1984). Development of these three reef terraces into their present form is thought to be related to fluctuations in sea level stands associated with the Holocene sea level transgression that began about 10,000 years ago. An extensive sand zone lies between the middle and outer reef communities. It is in this sand area that the offshore borrow areas are located.

Lighty *et al.* (1978) showed that active barrier reef development took place as far north as the Fort Lauderdale area as late as 8,000 years ago. It is possible that the reefs and hardground areas seen from Delray Beach southward are the result of active coral reef growth in the relatively recent past, whereas the hard bottom features seen north of Palm Beach Inlet may represent the outcropping of older, weathered portions on the Anastasia Formation. The reefs north of Palm Beach Inlet (Lake Worth Inlet) do not show the same orientation to shore as those to the south and the classical "three reef" hardgrounds description begins to differ north of that inlet (Continental Shelf Associates, Inc., 1993).

The composition of hardground biological assemblages along Florida's east coast has been detailed by Goldberg (1970, 1973), Marszalek and Taylor (1977), Raymond and Antonius (1977),

Marszalek (1978), Continental Shelf Associates, Inc. (1984; 1985; 1987; 1993), and Blair and Flynn (1989). Although there are a large variety of hard coral species growing on the reefs north of Government Cut, these corals are no longer actively producing the reef features seen there. The reef features seen north of Government Cut have been termed "gorgonid reefs" (Goldberg, 1970; Raymond and Antonius, 1977) because they support such an extensive and healthy assemblage of octocorals. Goldberg (1973) identified 39 species of octocorals from Palm Beach County waters. The U.S. Environmental Protection Agency (1992) lists 46 species of shallow water gorgonids as occurring along southeast Florida. Surveys by Continental Shelf Associates, Inc. (1984; 1985) identified 33 sponge, 21 octocoral, and 5 hard coral species on offshore reefs off Ocean Ridge and 40 sponge, 18 octocoral, and 14 hard coral species on the offshore reefs off Boca Raton. Blair and Flynn (1989) described the reefs and hard bottom communities off Dade County and compared them to the offshore reef communities from Broward and Palm Beach counties. They documented a decrease in the hard coral species density moving northward from Dade County to Palm Beach County. Despite this gradual decrease in the density of hard coral species present, the overall hardground assemblage of hard corals, soft corals, and sponges seen along southeast Florida's offshore reefs remains remarkably consistent throughout the counties of Dade, Broward, and Palm Beach. Commercially, the most important invertebrate species directly associated with these hardground areas is the Florida lobster, *Panulirus argus*.

Common fish species identified with the reef/hardground communities include grunts (Haemulidae), angelfish (Pomacanthidae), butterflyfish (Chaetodontidae), damselfish (Pomacentridae), wrasses (Labridae), drum (Sciaenidae), sea basses (Serranidae) snapper (Lutjanidae) and parrotfish (Scaridae). Important commercial and sport fish such as black margate (*Ansiotremus surinamensis*), gag (*Mycteroperca microlepis*), red grouper (*Epinephelus morio*), red snapper (*Lutjanus campechanus*), gray snapper (*L. griseus*) Hogfish (*Lachnolaimus maximus*) and snook (*Centropomus undecimalis*) are also associated with these reefs. The precise composition of the fish assemblage associated with any given location along these hardground areas is dependent upon the structural complexity of the reef at that location.

Herrema (1974) reported over 300 fish species as occurring off southeast Florida. Approximately 20 percent of these species were designated as "secondary" reef fish. Secondary reef fish are fish species that, although occurring on or near reefs, are equally likely to occur over open sand bottoms. Many of these species, such as the sharks, jacks, mullet, bluefish, sailfish, and marlin (none of which have significant local commercial value), are pelagic or open water species and are transient through all areas of their range.

3.4 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, 16 USC 1801 et seq. Public Law 104-208 reflects the Secretary of Commerce and Fishery Management Council authority and responsibilities for the protection of essential fish habitat (EFH). Federal agencies that fund, permit, or carry out activities that may adversely impact EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH. In conformance with the 1996 amendment to the Act, the information provided in this EA will comprise the required EFH assessment and will be coordinated with the NMFS.

The proposed project is within the jurisdiction of the South Atlantic Fishery Management Council (SAFMC) and is located in areas designated as EFH for coral. Coral reef and live bottom habitat, red drum, shrimp, spiny lobster, coastal migratory pelagic species and the snapper-grouper complex. In addition, the nearshore hardbottom habitat located in the vicinity of the proposed beach fill and the proposed ebb shoal borrow area are designated as Essential Fish Habitat-Habitat Areas of Particular Concern (EFH-HAPC) for the snapper-grouper complex.

3.5 COASTAL BARRIER RESOURCES

There are no designated Coastal Barrier Resource Act Units located in the project area that would be affected by this project.

3.6 WATER QUALITY

Waters off the coast of Dade counties are classified as Class III waters by the State of Florida. Class III category waters are suitable for recreation and the propagation of fish and wildlife. Turbidity is the major limiting factor in coastal water quality in South Florida. Turbidity is measured in Nephelometric Turbidity Units (NTU), which quantitatively measure light-scattering characteristics of the water. However, this measurement does not address the characteristics of the suspended material that creates turbid conditions. According to Dompe and Haynes (1993), the two major sources of turbidity in coastal areas are very fine organic particulate matter and sediments and sand-sized sediments that become resuspended around the seabed from local waves and currents. Florida state guidelines set to minimize turbidity impacts from beach restoration activities confine turbidity values to under 29 NTU above ambient levels outside the turbidity mixing zone for Class III waters.

Turbidity values are generally lowest in the summer months and highest in the winter months, corresponding with winter storm events and the rainy season (Dompe and Haynes, 1993; Coastal Planning & Engineering [CPE], 1989). Moreover, higher turbidity levels can generally be expected around inlet areas, and especially in estuarine areas, where nutrient and entrained sediment levels are higher. Although some colloidal material will remain suspended in the water column upon disturbance, high turbidity episodes usually return to background conditions within several days to several weeks,

depending on the duration of the perturbation (storm event or other) and on the amount of suspended fines.

3.7 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

The coastline within the project area is located adjacent to predominantly residential, commercial and recreational areas. The areas within the project are high energy littoral zones and the material used for nourishment are composed of particles with large grain sizes that do not normally have contaminants adsorbing to them. The nature of the work involved with the renourishment of beaches is such that contamination by hazardous and toxic wastes is very unlikely. No contamination due to hazardous and toxic waste spills is known to be in the study area.

3.8 AIR QUALITY

Air quality within the project area is good due to the presence of either on or offshore breezes. Dade County is in attainment with the Florida State Air Quality Implementation Plan for all parameters except for the air pollutant ozone. The county is designated as a moderate non-attainment area for ozone.

3.9 NOISE

Ambient noise around the project area is typical to that experienced in recreational environments. Noise levels range from low to moderate based on the density of development and recreational usage. The major noise producing sources include breaking surf, beach and nearshore water activities, adjacent residential and commercial areas, and boat and vehicular traffic. These sources are expected to remain at their present noise levels.

3.10 AESTHETIC RESOURCES

The project area consists of light sandy beige beaches that contrast strikingly with the deep hues of the panoramic Atlantic Ocean. The beach is located in a county park with a natural dune system and no large beachfront structures (i.e., condominiums, hotels, etc.) as in the rest of Dade County. The area consists of moderate to good aesthetic values with few exceptions throughout the entire project.

3.11 RECREATION RESOURCES

Dade County is a heavily populated county on Florida's Atlantic Coast that receives a tremendous volume of tourists, particularly during the winter months. Those beaches, which can be accessed by the general public, are heavily used year round. Those beaches which are associated with condominiums, apartments and hotels have more restricted access for the general public, but receive use from the many visitors who frequent these facilities as well as those members of the general public who walk or jog along the beachfront.

Haulover Beach Park is a public park and the beach receives heavy use by swimmers and sunbathers. Other water related activities within the project area include on-shore and offshore fishing, snorkeling,

SCUBA diving, windsurfing and recreational boating. Most of the boating activity in the area originates from either Bakers Haulover Inlet or Government Cut. Both offshore fishing and diving utilize the natural and artificial reefs located within and adjacent to the project area. Commercial enterprises along the beach rent beach chairs, cushions, umbrellas, and jet skis. Food vendors can also be found along the beach areas. The revenue generated by beachgoers supports a resurgent Miami Beach business district in the project vicinity.

3.12 HISTORIC PROPERTIES

Documented transportation activities along the southeastern coast of Florida date from the second half of the 16th century. As a consequence of over 400 years of navigation in the Bahama Channel, several hundred shipwrecks have been documented in the waters off the southeast coast of the state. Remains of these and other unrecorded shipwrecks may be located in the vicinity of the proposed borrow areas.

Archival research and field investigations have been conducted for the study area and coordinated with the Florida State Historic Preservation Officer (SHPO). Results of the investigations for the borrow areas south of Government Cut (including SGC-EXT-2) are discussed in the reports, *A Submerged Cultural Resource Magnetometer Survey for Two Borrow Areas, Second Beach Renourishment, Dade County, Florida*, May 1993 and *A Magnetometer and Side Scan Survey, Borrow Area Extension, Dade County, Florida*, October 1996. Both reports were prepared by Tidewater Atlantic Research. Five magnetic anomalies were identified in the areas surveyed during the field investigations described in the above referenced reports. One target was confirmed to be the remains of a modern steel hull vessel sunk as an artificial reef. The other four targets are considered to be potentially significant as their signatures correspond with those of previously identified National Register eligible submerged cultural resources.

Results of the field investigation of the ebb shoal borrow area are discussed in the report *Submerged Historic Properties Survey of Proposed Borrow Area for Dade County Shore Protection Project, Second Periodic Beach Renourishment at Bal Harbour* prepared by Tidewater Atlantic Research. Five magnetic anomalies were identified during the survey. Each signature was determined to be suggestive of modern debris and not a potentially significant submerged cultural resource. No additional investigation of the targets was recommended in the report.

No significant historic properties have been identified on the beach segment proposed for renourishment.

4. ENVIRONMENTAL EFFECTS

This section is the scientific and analytic basis for the comparisons of the alternatives. See table 1 in section 2.0 Alternatives, for summary of impacts. The following includes anticipated changes to the existing environment including direct, indirect, and cumulative effects.

4.1 GENERAL ENVIRONMENTAL EFFECTS

The placement of sand on the beach would restore some of the beach's ability to provide protection against storms and flooding. It would also enhance the appearance and suitability for recreation along the beach and would provide additional nesting habitat for threatened and endangered species of sea turtles. If no action is taken, the project beach would continue to erode and shoreline recession would continue. Dredging in the proposed borrow area would cause a depletion of sand, however the area does not currently support seagrass, reefs, hard bottom, or other particularly productive habitat that would be altered within the borrow area. Although hardgrounds are located outside of the borrow area, a buffer zone will be used to minimize or eliminate potential impacts due to dredging.

4.2 VEGETATION

4.2.1 BEACH RENOURISHMENT ACTIVITIES

There are no sea grasses or algal communities present in the footprint of the beach fill or the adjacent nearshore areas. No work would be performed on vegetated upland areas. No adverse impacts to either marine or terrestrial vegetation are expected.

4.2.2 PROPOSED BORROW AREA: EBB SHOAL AT BAKERS HAULOVER INLET

There are no seagrass beds present in the proposed ebb shoal borrow area. Depending on the season when dredging would occur, some ephemeral algal communities could be present in the borrow areas. Any algal communities present within the areas dredged would be affected. This impact would be short-term as the algal communities would be expected to regrow after dredging is completed.

4.2.3 BORROW AREA SOUTH OF GOVERNMENT CUT

Dredging impacts on vegetation in this borrow area would be similar to those discussed for the proposed borrow area.

4.2.4 DISTANT DOMESTIC SAND SOURCES

No distant offshore sources of sand have been identified or evaluated for this renourishment activity. Impacts associated with using distant offshore sources cannot be predicted at this time. It is possible that distant offshore sand sources may be identified in the future. The assessment of impacts on vegetation would occur at that time.

4.2.5 UPLAND SAND SOURCE

Sand from an upland source would be obtained from a commercial quarry. There would likely be some

loss of terrestrial vegetation at the quarry site in association with the excavation of sand.

4.2.6 NO ACTION ALTERNATIVE (STATUS QUO)

This alternative would have no effect on marine vegetation. However, continued erosion could eventually result in the loss of upland vegetation adjacent to the beach.

4.3 THREATENED AND ENDANGERED SPECIES

4.3.1 BEACH RENOURISHMENT ACTIVITIES

Beach nourishment and associated activities have the potential to impact sea turtles and may have the following effects. These potential effects would apply to any of the alternative sand sources discussed including the preferred borrow area.

a. Scarp development leading to hindrance or blockage of accessibility to nesting habitat.

b. Adverse alteration of moisture levels or temperature in beach due to modified nesting material.

c. Compaction and cementation of beach sediments that cause reduced nesting success and aberrant nest cavity construction resulting in reduced nesting and/or hatching success.

d. If carried out during the nesting season, there is a potential for the destruction of nests that are not identified during the daily nest survey and relocation program.

e. Disruption of nesting activities that could lead to poor nest site selection and energetic cost diminishing egg production.

f. Disorientation or misorientation of hatchlings from adjacent beaches by artificial lights on dredge equipment or construction equipment on the beach.

Important physical characteristics of beaches include sand grain size, grain shape, silt-clay content, sand color, beach hardness, moisture content, mineral content, substrate water potential, and porosity/gas diffusion. By using proper management techniques such as nest relocation, tilling of compacted beaches, use of compatible sand, and smoothing of scarp formations, most of the negative effects can be avoided or corrected (Nelson and Dickerson, 1989a).

Artificial lighting along the beach is known to effect the orientation of hatchlings (Dickerson and Nelson, 1989; Witherington, 1991) and to effect the emergence of nesting females onto the beach

(Witherington, 1992). If beach nourishment occurs during the sea turtle nesting season, lighting associated with construction activities on the beach may effect hatchlings and nesting females. Research has shown that low-pressure sodium (LPS) lights that emit only yellow wavelengths do not attract hatchlings (Dickerson and Nelson 1989; Nelson and Dickerson, 1989b). Witherington (1992) demonstrated that LPS lights on the beach did not significantly effect the nesting behavior of green or loggerhead sea turtles. The use of LPS lighting at the beach nourishment site and on the dredge can reduce the potential for lighting effects on sea turtles. However, the Corps is currently evaluating the appropriateness of using LPS lights in a marine construction environment for safety reasons. If, in consultation with the USFWS and FDEP, it is found not to be appropriate to use in this situation, LPS lights would not be required.

4.3.2 PROPOSED BORROW AREA: EBB SHOAL AT BAKERS HAULOVER INLET

The material within the proposed borrow areas that will be dredged and placed on the beach is similar to the existing beach sand, is low in silt content and therefore, would be compatible with sea turtle nesting. As previously mentioned in Section 2.1.1, the water depth within the proposed borrow area is too shallow for a hopper dredge. Therefore, none of the potential impacts to sea turtles that can be associated with hopper dredging would occur. It is anticipated that a hydraulic pipeline dredge would be used to perform the work. No impacts are expected on sea turtles from using this type of dredge (NMFS Regional Biological Opinions dated August 25, 1995, amended September 25, 1997).

4.3.3 BORROW AREA SOUTH OF GOVERNMENT CUT

Hopper dredging in harbors and entrance channels is known to adversely effect sea turtles by entrainment. These incidents occur because sea turtles utilize and are concentrated in these channels during certain times of the year. Sea turtles utilize hardground and reef areas for foraging and resting and may be present on the hardground areas adjacent to the proposed borrow areas during dredging. It is not expected that sea turtles will concentrate in the sandy borrow area as they do in navigation channels; therefore it is unlikely that the dredge draghead will come into direct contact with a sea turtle. Since the boundary of the borrow area is designed to avoid hardgrounds, it is not expected that the hopper dredge will have a direct impact on any sea turtles utilizing the hardgrounds for resting or foraging. To further ensure that sea turtles are not entrained by the dredge, the use of a draghead designed to deflect sea turtles would be required on the dredge. The deflector draghead is designed to form a sand wedge in front of it that will push out of the way any sea turtle that it comes in contact with. The deflector draghead has been successfully used in the maintenance dredging of navigation channels along the Southeastern United States. During past beach

nourishment projects there has been no evidence of sea turtles being entrained by a hopper dredge dredging sand material from an offshore borrow area. The material within this borrow area is similar to the existing beach sand, is low in silt content and therefore, would be compatible with sea turtle nesting.

4.3.4 UPLAND SAND SOURCE

The material obtained from an upland source would be predominantly quartz which would replace a predominantly calcium carbonate beach. It is not expected that the quartz sand itself would significantly effect nesting sea turtles or hatching success since the majority of the high density nesting beaches in Florida are comprised of predominantly quartz sand (i.e., Brevard County). However, some of the other negative impacts previously discussed (sand compaction, potential for scarp formation, artificial lighting effects, etc.) would still apply.

4.3.5 NO ACTION ALTERNATIVE (STATUS QUO)

If no action is taken, the beach would continue to erode. If left to erode, this could ultimately result in the loss of sea turtle nesting habitat and/or poor nest site selection. No adverse impacts are expected on other listed species.

4.4 FISH AND WILDLIFE RESOURCES

4.4.1 BEACH RENOURISHMENT ACTIVITIES

During the placement of sand on the beach there may be some interruption of foraging and resting activities for shorebirds that utilize the project area. This impact would be short-term and limited to the immediate area of disposal and time of construction. There would be sufficient beach area north and south of the renourishment sites that can be used by displaced birds while construction takes place. Increased foraging opportunities for some species, such as sea gulls, can also occur as a result of the discharge activity. Elevated turbidity levels within the immediate vicinity of the discharge site may interfere with foraging by sight feeders such as the brown pelican (*Pelecanus occidentalis*). However, increased turbidity levels would be limited to a small portion of the shoreline and should not result in significant impacts to foraging activities.

The disposal of sand on the beach would have temporary impacts to the macroinfaunal community. Some organisms may be buried and lost, but many organisms inhabiting the intertidal zone are well adapted for burrowing and would be able to burrow up through the fill material and survive. Turbidity levels along the disposal site would temporarily increase, but would return to normal after beach equilibrium is achieved. Organisms inhabiting this zone would be impacted by the run off from the disposal area but are adapted for survival in such conditions and impacts should be minor. Dominant infaunal inhabitants of the intertidal zone, such as amphipods, isopods and polychaetes typically possess high fecundity and rapid turnover rates

during their breeding season. Because of this, any losses due to construction activities would be replaced within a short time. No long-term adverse effects are anticipated to the intertidal macroinfaunal community due to nourishment activities (Deis, et al. 1992, Nelson 1985, Gorzelany & Nelson 1987, USFWS 1997).

Minimal impacts to nearshore hardbottom communities are expected by sand placement (i.e., disposal) on the beach due to the distance of the reefs to the shore. In conjunction with the Coast of Florida Erosion and Storm Effects Study, the hardbottom areas offshore of Dade County were mapped using side scan sonar. In addition, aerial photography flown in July 1997 has also been used to map the nearshore hardbottom. The closest hardbottom community in the vicinity of the proposed beach fill at Haulover Beach Park is in excess of 800 feet offshore (figure 5).

4.4.2 PROPOSED BORROW AREA: EBB SHOAL AT BAKERS HAULOVER INLET

Organisms similar to the beach macroinfaunal community can be found in the proposed borrow area. Dredging would result in the loss of these organisms; however, recolonization is expected to be fairly rapid. In a study of a borrow area located offshore of Delray Beach, Florida, Bowen and Marsh (1988) concluded that recovery of the infaunal community occurred within 1 year. Cutler and Mahadevan (1982) found no significant differences in biotic communities between borrow sites and surrounding areas off Panama City, Florida, some 3-4 years after a beach nourishment project. No long-term adverse impacts are expected to macroinfaunal communities that inhabit the proposed borrow site.

There are no hardbottom communities present within the proposed borrow area. The western edge of the first reef (hardbottom habitat) comes within approximately 400 feet of the eastern tip of the borrow area. Proper controls and procedures would be utilized to avoid the mechanical damage, which could result from the dredge or associated equipment coming in contact with the hardbottom. The reef edge would be marked with buoys to prevent encroachment by the dredge, and no anchoring would be permitted in hardbottom areas. The discharge pipeline would be placed in sand areas only, between the borrow area and the beach. Recording and displaying, real-time precision electronic location equipment would be in use during dredging operations. This equipment would provide the precision equivalent to that of a differential GPS system, provide records of the exact position of the dredge to the operator and allow continuous monitoring of the dredge location during operations.

To further protect the reefs in the vicinity of the borrow area a reef monitoring program would be conducted. The program would monitor and evaluate numerous biological and physical characteristics and

indicators for signs of stress or impact related to construction activities. This comprehensive program is designed to identify factors that may contribute to or cause stress and minor impacts, before they cause non-reversible impacts. Among the parameters assessed in the monitoring program are: benthic community structure, including hard coral, sponge and algal populations; fish populations of the hardbottom areas; infaunal assemblages of the beach area and borrow area; water quality, including nutrients, light penetration, turbidity and physical characteristics. These factors will be surveyed prior to and after project construction, and will be monitored regularly during project construction. The monitoring plan is described in Appendix E, *Physical and Biological Monitoring Program for Miami-Dade County, Florida, Beach Erosion Control and Hurricane Protection: Bal Harbour/Haulover Beach Renourishment*.

4.4.3 BORROW AREA SOUTH OF GOVERNMENT CUT

Dredging impacts to the macroinfaunal communities within the SGC-EXT-2 borrow area would be similar to that discussed for the proposed ebb shoal borrow area.

The borrow area is located between the second and third reef hardbottom communities. Sessile organisms associated with the hardbottom community may be susceptible to some degree of negative impact due to dredging. Potential adverse impacts to these communities may occur due to suspended sediments settling onto the reef, mechanical damage from contact by the dredge drag arm with the reef, or turbidity. As a group, scleractinian corals are the most sensitive to potential impacts. Gorgonian corals, sponges, and some other sessile organisms are more tolerant of increased turbidity and sedimentation. Past occurrences of mechanical and/or sedimentation damage to reef communities have been documented for the renourishments at Sunny Isles in 1988 and at Bal Harbour in 1990. Mechanical damages in 1988 and 1990 to reefs were from contact with the dredge drag-arm. In the 1988 incident, the dredge damaged hardbottom outside the designated dredging area. In the 1990 incident the dredge caused damage to previously undiscovered hardbottom within the designated dredging area. Sediment impacts to the reef during the 1990 incident was caused by the dredge spending a significant amount of time dredging in one confined area between reefs located immediately north and south of the area dredged. Blair and Flynn (1988) and Blair et al. (1990) discuss factors believed to have contributed to the impacts documented, and recommended modifications to project specifications to reduce or eliminate the impacts. If any of these borrow areas were to be used for this project special considerations would be incorporated to avoid or minimize the potential for impacts to the hardbottom communities.

A buffer zone with a minimum distance of 400 ft from any hardbottom area would be established. Extensive turbidity monitoring would be performed at the dredging sites, throughout the construction phase of the project to ensure levels of turbidity are maintained below the State water quality standard. Visual inspections of the hardbottoms adjacent to the borrow area would be performed. The regions of hardbottom in proximity to the dredging area would be surveyed routinely to look for any indicators of turbidity or sediment impacts. Marine biologists with experience in impact assessment would conduct the surveys and examine the benthic organisms for pre-defined indicators of stress or imminent impact. Findings of such indicators would cause actions ranging from consultation to halting of the dredge operations until a determination can be made as to the cause and rectification of the factors creating the stress or imminent impact. The established buffer zones, borrow area usage restrictions and visual inspections of the reef would minimize or eliminate turbidity and sedimentation impacts.

Proper controls and procedures would be utilized to avoid the mechanical damage, which could result from the dredge or associated equipment coming in contact with the hardbottom. Project and construction specifications that would prevent such damage are: (a) Recording and displaying, real-time precision electronic location equipment must be in use during dredging operations. This equipment would provide the precision equivalent to that of a differential GPS system, provide records of the exact position of the dredge to the operator and allow continuous monitoring of the dredge location during operations. Daily reports would include a plot indicating the dredge location while operating in or within a quarter of a mile of the borrow area, keyed to a printout listing coordinates at specified time intervals. (b) Pipelines would be placed only in approved locations and anchoring would be permitted in sandy areas only. (c) The borrow area perimeter will be marked by placement of Coast Guard approved lighted buoys. The buoys will be placed at an interval no greater than 400 ft apart, at every change of direction of the borrow area, and no closer than 400 feet from any hardbottom area. The distance of all borrow area buoys from the hardbottoms will be verified by divers and their positions recorded. (d) The edge of the hardbottoms adjacent to the borrow area will be marked by buoys at a sufficient frequency to visually discern the line of hardbottom edge. All buoys (borrow area and hardbottom) will be checked regularly, and replaced or repositioned as necessary, throughout the period of construction. (e) The Corps and Dade County DERM have developed a procedure that would allow suspension or alteration of the dredging operation if monitoring by DERM indicates a problem.

Additional measures to protect the reefs in the vicinity of the borrow area would include an intensive reef monitoring program. The program would monitor and

evaluate numerous biological and physical characteristics and indicators for signs of stress or impact related to construction activities. This comprehensive program is designed to identify factors that may contribute to or cause stress and minor impacts, before they cause non-reversible impacts. Among the parameters assessed in the monitoring program are: benthic community structure, including hard coral, sponge and algal populations; fish populations of the hardbottom areas; infaunal assemblages of the beach area and borrow area; water quality, including nutrients, light penetration, turbidity and physical characteristics. These factors will be surveyed prior to and after project construction, and will be monitored regularly during project construction.

Rock, shell and coral rubble material that would be dredged up with the sand, but unsuitable for placement on the beach (i.e., >1 in. diam.), would be placed in a permitted artificial reef site. The habitat in the area where the rock is deposited, would change from what is now a predominantly sand benthic macroinfaunal community to a hardbottom benthic community. The rock would provide a concentrated hard substrate suitable for colonization by sessile benthic organisms. This would allow for the development of coral, plant, invertebrate and vertebrate communities and would provide a viable habitat with refuge, food resources, and a potential breeding ground for a wide variety of marine organisms. This would be the best use of this material, as the rock separated from the sand would be, and have been, devoid of external epibiotic growth (algae, sponges, coral, encrusting organisms) at the time of removal. The rock material that would be disposed in the artificial reef site is clean natural material.

To use the SGC-EXT-2 borrow area would most likely require using a hopper dredge. Because of the water depth required for a hopper dredge, it must remain seaward of the first reef tract to pump material to the beach. It therefore, would be necessary to place a discharge pipeline across the reef from an offshore pump-out platform to the beach fill site. The placement a pipeline across the reef would have an impact on the benthic community. Potential impacts include: physical crushing, abrasion and shading of benthos (algae, sponges, soft coral and hard coral). It is expected that the major impact would occur to sponges, algae and soft corals, with some loss to hard corals. The actual level and extent of impact would be determined through post-construction surveys.

The substrate located within the footprint of the pipeline will be temporarily impacted by the placement of the pipeline. However, when the pipeline is removed the area will be re-exposed and new benthic populations will begin to quickly establish. Past observations during previous renourishments (Miami Beach 1994; Sunny Isles and

Miami Beach 1997; Surfside and South Miami Beach 1999) have shown that the pipeline made only occasional contact with the bottom, minimizing the impact by reducing the amount of substrate and number of benthic organisms contacting the pipeline. Post-placement inspection of the pipelines found them to be in contact with the reef only sporadically. Irregularities of the reef and the connector collars (or rings) used to connect the pipe segments, held the pipeline off the reef surface for considerable distances. In general, impacts to the bottom were much less than expected. The most severe impacts noted were to large hard coral heads having a colony diameter up to 2.0 m. The most common impact was to erect, dendroid soft corals that bordered the pipeline. These corals were abraded by the constant wave surge moving their branches against the pipeline. The actual impact was considerably less than the pre-project estimated impact. This was the result of several factors. The pre-project evaluation of the reef area over which the pipeline was to be placed provided a "minimal impact" path for the corridor. In addition, the connector rings for the pipeline segments raised substantial lengths of the pipe off the bottom (between 50 and 100 feet, dependent on localized relief). Finally, the irregularities of the reef itself served as point supports for the pipe, allowing substantial lengths of the pipeline (up to 150 to 200 feet) to remain off the bottom. Although organisms in contact with the pipe (soft corals, sponges and hard corals) were impacted, many of these were saved by the "suspended" pipeline. For the 1999 Surfside and South Miami Beach renourishment, the Corps included a requirement in the contract plan and specifications for "collars" to be placed along the pipeline at 100-foot intervals. The contractor elected to use large tractor tires which were slid over the pipeline and secured in place by pieces of chain that were passed through the side-wall of the tire and attached to "eyes" welded to the exterior of the pipe. Underwater surveys of the pipeline indicated that the tires were successful in holding the pipe off the bottom to a much greater extent than seen in previous projects.

Any impacts to the first reef from placing the pipeline will be appropriately mitigated. The preferred mitigation program would provide for "in-kind" mitigation. For the proposed project this would mean providing relatively low relief shallow water habitat composed of limerock or carbonate based reef materials and placed as close to the impacted area as possible. Currently there are two reef components in use that would satisfy the preferred material conditions. One is limerock boulders and the other is prefabricated modules composed of pre-cast concrete culvert, with limerock grouted to the exterior surface. The prefabricated modules were used to mitigate for the 1997 Sunny Isles and Miami Beach project and the 1999 Surfside and South Miami Beach project. A mitigation plan specific to this project would be developed in coordination with FDEP, DERM, and the Corps.

Fish are a highly motile group of organisms. During dredging most fish species will avoid the dredge area and quickly return upon dredging completion. No long-term impacts are expected to fish communities inhabiting the borrow area. The rock disposal area should provide a substrate that will act as an artificial reef and be beneficial to fish. Many gamefish species, both juveniles and adults, are associated with these areas. Hardgrounds generally display increased productivity compared to sand bottoms.

4.4.4 DISTANT DOMESTIC AND UPLAND SAND SOURCES

The use of any of these sand sources would not have any of the adverse affects on the local hardground communities that would be associated with the dredging of an offshore borrow area. However, using other offshore sources would involve dredging at the location of the source of sand. The impacts of dredging at alternate sites cannot be predicted, not knowing location of the area(s) that would be dredged or the types of habitats present. It is expected that any hardground that might be present would be avoided to the extent practicable and that unavoidable impacts would be mitigated. Using an alternate offshore source would require pumping the material to the beach from the transport vessel. This would also be required if upland sand were barged to the project area and trucks were not used to haul the material to the beach. Both these options would have the same impacts to the nearshore reef community (from pipeline placement) as discussed for the borrow areas south of Government Cut in Section 4.4.3.

4.4.5 NO ACTION ALTERNATIVE (STATUS QUO)

With the no action alternative, none of the impacts associated with dredging an offshore borrow area would occur.

4.5 ESSENTIAL FISH HABITAT

Impacts to EFH from the proposed project are discussed in detail in Section 4.4 and 4.7 of this EA.

Proper controls and procedures (buffer zones, buoys, real-time positioning, GPS, etc.) will be implemented to avoid mechanical damage to hardbottom communities adjacent to the ebb shoal borrow area. In addition, a monitoring program would be conducted to look for signs of stress or impact related to the construction activities before non-reversible impacts occur. With these precautions in place, no significant impact to the nearshore hardbottom communities adjacent to the ebb shoal borrow area are expected.

There will also be temporary turbidity impacts to the water column from dredging and beach fill activities in the vicinity of the borrow area and beach fill site. Turbidity is not expected to exceed the State standard of 29 NTU's above background.

4.6 COASTAL BARRIER RESOURCES

The purpose of the Coastal Barrier Resources Act is to minimize the loss of human life, wasteful expenditure of Federal moneys; and the damage to fish, wildlife, and other resources associated with the coastal barriers along the Atlantic coast by restricting future Federal expenditures and financial assistance, which have the effect of encouraging development of these coastal barriers. There are no designated Coastal Barrier Resource Act Units located within or adjacent to the project area.

4.7 WATER QUALITY

The proposed action would cause temporary increases in turbidity at borrow area and beach disposal sites. The State of Florida water quality regulations require that water quality standards not be violated during dredging operations. The standards state that turbidity outside the mixing zone shall not exceed 29 NTU's above background. Results from turbidity monitoring at previous beach nourishment projects have shown that the turbidity did not exceed the standard. Various protective measures and monitoring programs would be conducted during construction to ensure compliance with state water quality criteria. Should turbidity exceed State water quality standards as determined by monitoring, the contractor would be required to cease work until conditions returned to normal. The proposed action has been evaluated in accordance with Section 404 of the Clean Water Act and a 404(b) evaluation report has been included as Appendix A to this EA. The use of other submerged borrow sites would have similar turbidity impacts on water quality as using the proposed borrow area. Use of upland sources would not have the impacts associated with dredging an offshore borrow area, but would have the same impact along the beach fill area.

4.8 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE

There are no hazardous, toxic, or radioactive waste sites or producers in the project area that would be affected as a result of the preferred alternative. No impacts associated with the disturbance of such sites are anticipated from either the recommended or no-action alternatives. However, use of previously uninvestigated borrow sources would require examination for potential problems with harmful substances. This would involve examination of recorded spills and a "Preliminary Assessment Screen". If these indicate a potential for contamination, we would either try to avoid the potential contamination, look for another site, or consider remediation.

With the use of dredging and construction equipment in the in the areas around the borrow and beach fill sites, there is the potential for hydrocarbon spills or other effluent releases. However, the likelihood of significant accidents and releases of this sort is very remote. The contract specifications will require the contractor to develop accident and spill prevention

plans. The no-action alternative should not allow conditions to develop that would increase accidents or releases of this sort.

4.9 AIR QUALITY

Direct emissions from the proposed action would be confined to exhaust emissions of labor transport equipment (land and water vehicles), and construction equipment (dredge barges), and likely well under the *de minimus* levels for ozone non-attainment areas as cited in 40 CFR 91.853; that is, projects implemented cannot produce total emissions greater or equal to 100 tons per year of Volatile Organic Compounds (VOCs). Any indirect increase in emissions (indirect emissions), as a result of the proposed action is beyond the control and maintenance of the USACE. Consequently, a conformity determination with the Florida State Implementation Plan is inappropriate for increases of indirect emissions from the proposed action. As with the proposed action and alternatives, the no-action alternative will see continued development, which may cause marginal adverse impacts to air quality. The extent of these impacts, however, is difficult to predict.

4.10 NOISE

With the implementation of the proposed action there would be a temporary increase in the noise level during construction. The principle noise would stem from the vicinity of the discharge point on the beach, the breakwater construction site and the dredge. Construction equipment would be properly maintained to minimize the effects of noise. Increases from the current noise levels as a result of the proposed action would be localized and minor, and limited to the time of construction. There would be no noise related impacts associated with the no-action alternative.

4.11 AESTHETICS

There would be a temporary increase in the noise level during construction. The principle noise would stem from the vicinity of the discharge point on the beach and the dredge. Construction equipment would be properly maintained to minimize the effects of noise. Increases to the current levels of noise as a result of this project would be localized and minor, and limited to the time of construction. Engine exhaust fumes would be rapidly carried away by breezes. Any temporary decrease in air quality caused by this work would be corrected once work is completed. Hundreds of feet of dredge pipe lying on the beach or just offshore would have a negative visual impact on the aesthetics of the area. This impact would only be temporary and would be removed along with the pipe at the completion of the work. The negative visual impacts of the equipment and pipe would be offset to an extent by the natural curiosity of some individuals to see what is going on and how work is progressing. There would also be a temporary increase in turbidity during construction adjacent to the point of discharge. Turbidity would return to normal levels once construction activities

cease. Once completed the proposed project would result in an overall improved aesthetic quality. The placement of sand on the beach would restore the natural appearance of the shore. With the no-action alternative, the shoreline would continue to erode. This would result in the loss of existing the shoreline, which would reduce the visual aesthetics of the area.

4.12 RECREATION

During nourishment activities, the use of the beach in the vicinity of construction would drop or be restricted temporarily. Use of the beach in the immediate area of the discharge pipe and equipment would be restricted for public safety. Noise from the heavy equipment needed to spread and smooth the sand would disturb some users as well. Many visitors would seek quieter areas for sunbathing or swimming. As portions of the renourished beaches come available, use by the general public would increase once more. After nourishment of the beach, use by the general public and those who stay at the condominiums and hotels would return to pre-erosion activity levels. The general public would be more inclined to use these beaches rather than by-passing them for others with more sand above the high tide line. There would be a temporary adverse effect on recreational fishing in the immediate area of beach fill operations and at the borrow area due to construction activities and turbidity. Fishing would not be affected outside the area of immediate construction. Nearshore snorkeling, and SCUBA diving activities may also be impacted by increased turbidity during construction activities and shortly thereafter. Long-term adverse impacts to these water activities are not anticipated. Boat operations may be detoured during construction activities; however, the extent of these detours and time frame of operations render these impacts insignificant. With the no-action alternative, the shoreline would continue to erode. This would eventually reduce the amount of beach available for recreation and would result in the degradation or loss of shorefront property thus, adversely impacting beach recreational opportunities within the area. There would be no construction related impacts to fishing, snorkeling and SCUBA diving with the no-action plan.

4.13 HISTORIC PROPERTIES

As stated previously, archival research and field investigations were conducted for the ebb shoal borrow area proposed for this project. Five magnetic anomalies were identified during the survey. Each anomaly was determined to be modern debris and not a potentially significant cultural resource. A report describing these investigations was coordinated with the SHPO. In a letter dated November 18, 1997, the SHPO concurred with the Jacksonville District's no effect determination for the anomalies in the vicinity of the borrow area

4.14 ENERGY REQUIREMENTS AND CONSERVATION

The energy requirements for this construction activity would be confined to fuel for the dredge, labor

transportation, and other construction equipment. The expenditure of energy would be much less using the proposed ebb shoal borrow area than obtaining material from other sources described in the alternatives section. For example, obtaining sand from the SGC-EXT-2 borrow area or other distant sources would require the use of more energy to transport the sand for beach fill. The use of upland sand would most likely require the expenditure of additional energy to perform repairs to local roads and highways damaged by trucks hauling material to the beach. The no-action alternative would allow conditions to develop that may endanger coastal property from storm surges and wave erosion during future storm events. On-site preventive measures and post clean-up under the no-action alternative would likely demand greater energy than that required of the proposed action.

4.15 NATURAL OR DEPLETABLE RESOURCES

In this case, the beach quality sand used to construct the project is the depletable resource. Using sand from the proposed borrow area would temporarily deplete the sand source from the areas dredged at that site. Eventually the sand will be redistributed over nearshore areas. However, the borrow area is located in the active ebb shoal for Baker's Haulover Inlet and therefore, would recover over time. The gasoline and diesel fuel used by the dredge and other construction equipment is also a depletable resource.

4.16 CUMULATIVE IMPACTS

Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). The use of sand from the proposed borrow area will deplete the area of sand and species of relatively non-motile infaunal invertebrates (mollusks). However, many of those species that are not able to escape the construction area are expected to recolonize after project completion. The proposed action would result in long-term benefits, which should outweigh any short-term environmental losses. The cumulative impact of shore protection projects along the Florida coast has been to restore and maintain many beaches which otherwise would have experienced severe erosion or would have totally disappeared. In addition, these activities have reduced property damage and helped maintain property value.

4.17 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

4.17.1 IRREVERSIBLE

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. The energy and fuel used during construction would be an irreversible commitment of resources.

4.17.2 IRRETRIEVABLE

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. An example of an irretrievable loss might be where a type of vegetation is lost due to road construction. Benthic organisms within the borrow area and beach fill area that would be eliminated during construction would be irretrievably lost for a period of time. However, the high rate of repopulation expected from these organisms reduces the significance of the loss.

4.18 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Species of relatively non-motile infaunal invertebrates that inhabit the borrow area will unavoidably be lost during dredging. Those species that are not able to escape the construction area are expected to recolonize after project completion. There would be

an unavoidable reduction in water clarity and increased turbidity and sedimentation. This would be limited to the immediate areas of dredging and beach fill operations. This impact will be temporary and should disappear shortly after construction activities cease.

4.19 LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY

We recognize that protection of the shoreline is a continual effort. No acceptable and permanent one-time fix has been identified. Using periodic renourishment is an ongoing effort. Renourishment efforts have a temporary and short-term impact on the biological resources on and near the shore. Removal of material from offshore borrow sites has a long-term impact on the nature of the borrow site. However, these impacts are not substantial since there are no special resources within the borrow site and some resources remain after dredging.

5. ENVIRONMENTAL COMMITMENTS

The U.S. Army Corps of Engineers and contractors commit to avoiding, minimizing or mitigating for adverse effects during construction activities by including the following commitments in the contract specifications:

(1) Inform contractor personnel of the potential presence of sea turtles and manatees in the project area, their endangered status, the need for precautionary measures, and the Endangered Species Act prohibition on taking sea turtles, manatees and other threatened or endangered species.

(2) Take precautions during construction activities to insure the safety of the manatee. To insure the contractor and his personnel are aware of the potential presence of the manatee in the project area, their endangered status, and the need for precautionary measures, the contract specifications would include the standard protection clauses concerning manatees. The contractor would instruct all personnel associated with the construction of the project about the presence of manatees in the area and the need to avoid collisions with manatees. All vessels associated with the project shall operate at 'no wake' speeds at all times while in shallow waters, or channels, where the draft of the boat provides less than three feet clearance of the bottom. Boats used to transport personnel shall be shallow draft vessels, preferably of the light-displacement category, where navigational safety permits. Vessels transporting personnel between the landing and any workboat shall follow routes of deep water to the extent possible. Shore crews or personnel assigned to the disposal site for the workshift shall use upland road access if available. All personnel would be advised that there are civil and criminal penalties for harming, harassing, or killing manatees, which are protected under the Endangered Species Act and the Marine Mammal Protection Act. The contractor shall be held responsible for any manatee harmed, harassed, or killed as a result of the construction of the project. If a manatee is sighted within 100 yards of the dredging area, appropriate safeguards would be taken, including suspension of dredging, if necessary, to avoid injury to manatees. The contractor shall keep a log of all sightings, collision, injuries, or killings of manatees during the contract period. Any manatee deaths or injuries will be immediately reported to the Corps of Engineers and the USFWS (Vero Beach Office).

(3) To minimize adverse impacts to sea turtles the Corps will implement the terms and conditions as stated in the NMFS Regional Biological Opinion for hopper dredging on the Southeast Atlantic Coast as amended on September 25, 1997. The Corps will also implement all the terms and conditions as outlined in the USFWS Biological Opinion issued on May 17, 2002 (Appendix C). Measures to minimize adverse effects to sea turtles are summarized below:

a. Nourished beaches would be plowed to a depth of at least 36 inches within one week following the completion of the entire beach nourishment (or sooner on completed sections) if sand compaction is greater than 500 cone penetrometer units.

b. Nourished beaches would be checked for compaction every 500 feet along the project area. One station shall be at the seaward edge of the dune/bulkhead line (when material is placed in this area); one station shall be located between the dune line and the high water line; and one station shall be located just landward of the mean high water line. At each station three readings would be made at 6, 12, and 18-inch depths three time (three replicates). If any two or more adjacent stations have compaction at the same depth greater than 500 cone penetrometer units, the area would be plowed to a depth of at least 36 inches immediately prior to April 1. This process would be completed for three consecutive years following project completion.

c. Nest relocation activities must begin 65 days prior to nourishment activities which occur within the nesting and hatching season (April 1 - November 30) or by April 1, whichever is later. Nest surveys and relocations shall continue through the end of the project or September 30, whichever is earlier.

d. Nest surveys and relocations would be conducted by personnel with prior experience and training in nest survey and relocation procedures, and with a valid permit from the Florida Fish and Wildlife Conservation Commission (FWC) for handling sea turtles and relocating nests.

e. Nests would be relocated between sunrise and 9 a.m. each day, and the relocation would be to a nearby hatchery in a secure setting where artificial lighting would not conflict with hatchling orientation.

f. In the event a turtle nest is dug up by beach construction activities, the contractor shall immediately notify the FWC permitted individual responsible for nest relocation so that the nest can be moved to the beach hatchery.

g. A report describing the actions taken to implement the terms and conditions shall be submitted to the USFWS within 60 days of completion of the proposed work for each year when activity has occurred. The report shall include the dates of actual construction activities, names and qualifications of personnel involved in nest surveys and relocation activities, descriptions and locations of the hatcheries, nest survey and relocation results and hatching success of the nests.

h. Nourished beaches would be surveyed for escarpments immediately after construction and prior to April 1, for 3 subsequent years. Any escarpments that exceed 18 inches in height and 100 feet length would be leveled by April 1.

i. Measures will be taken to reduce night time beach lighting including: eliminating extraneous lighting to an amount necessary for safe operations and safety of personnel.

The following would apply if a hopper dredge were to be used:

j. The drag arms of the hopper dredge will be fitted with a rigid sea turtle deflector draghead, and modified as necessary to eliminate sites of inadvertent entrainment of sea turtles.

k. The inflow to the hoppers will be screened as close to 100% as possible. There will be 100% observer coverage to monitor the screens for evidence of turtle take.

l. To minimize the potential for sea turtle entrainment, the dredge pumps would be shut down before the draghead is lifted off the bottom and would not be turned on until the draghead is placed on the bottom. NOTE: If the actual dredging operation has difficulty with this procedure, the Corps reserves the right to re-consult with NMFS to delete or modify this requirement.

(4) Monitor turbidity at both the dredging and discharge sites. Should monitoring reveal turbidity levels above State standards, outside the allowable mixing zone, work would be suspended until turbidity levels return to within those standards.

(5) Precautions would be implemented during construction to minimize potential impacts to the nearshore hardbottom communities adjacent to the ebb shoal borrow area. A buffer zone of at least 400 feet has been established between the borrow area and any hardbottom habitat.

(6) A sedimentation and biological monitoring program to assess possible impacts of dredging operations to reef and live-bottom habitats near the borrow area would be conducted. A physical and biological monitoring program is included as Appendix E to this EA.

6. COMPLIANCE WITH ENVIRONMENTAL REQUIREMENTS

6.1 NATIONAL ENVIRONMENTAL POLICY ACT OF 1969

Environmental information on the project has been compiled and a Draft Environmental Impact Statement, dated March 2002 was prepared and circulated to the appropriate Federal, State and local agencies and other interested parties for their review and comment. The project is in compliance with the National Environmental Policy Act.

6.2 ENDANGERED SPECIES ACT OF 1973

In a letter dated March 1, 2000 the Corps submitted project information to the National Marine Fisheries Service (NMFS) pursuant to Section 7 of the Endangered Species Act. In the letter the Corps had determined that the proposed project activities were covered under their Regional Biological Opinion (RBO) on hopper dredging along the Southeast Atlantic Coast as amended on September 25, 1997. In a letter dated March 13, 2000 the NMFS concurred with that determination. The Corps has determined the proposed project may affect but is not likely to adversely affect sea turtles under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). In a letter dated February 29, 2000 the Corps determined that the USFWS Programmatic Biological Opinion, issued on October 24, 1996, for Region III of the Coast of Florida Erosion and Storm Effects Study applied to Haulover Beach Park project. The Corps has also determined that the changes to the "Reasonable and Prudent Measures" and "Terms and Conditions" as stated in USFWS letter dated October 4, 2000 also apply. The USFWS issued a Biological Opinion (BO) for this project on May 17, 2002. Refer to Appendix C for correspondence and the USFWS BO. The project has been fully coordinated under the Endangered Species Act and therefore, is in full compliance with the Act.

6.3 FISH AND WILDLIFE COORDINATION ACT OF 1958

This project has been coordinated with the U.S. Fish and Wildlife Service (USFWS). Information concerning the project design, borrow area location, geotechnical data on the fill material, dredging methodology and the location of hardbottom communities has been provided to the USFWS. Several previous fish and wildlife studies have been conducted by the USFWS for the Dade County BEC & HP Project, including the ebb shoal borrow area proposed for the renourishment at Haulover Beach Park. (USFWS, 1997a, 1997b, 2001). The recommendations of the USFWS have been given full consideration in developing the design of this project. This project is in full compliance with the Act.

6.4 NATIONAL HISTORIC PRESERVATION ACT OF 1966 (INTER ALIA)

(PL 89-665, the Archeology and Historic Preservation Act (PL 93-291), and executive order 11593) Archival research, field investigations, and consultation with the Florida State Historic Preservation Officer (SHPO), have been conducted in accordance with the National Historic Preservation Act, as amended; the Archeological and Historic Preservation Act, as amended and Executive Order 11593. Refer to Section 4.13 for results of SHPO consultation. The project will not affect historic properties included in or eligible for inclusion in the National Register of Historic places. The project is in compliance with each of these Federal laws.

6.5 CLEAN WATER ACT OF 1972

The project is in compliance with this Act. On July 27, 2001 the Florida Department of Environmental Protection issued Water Quality Certification (permit no. 0128781-001-JC. All State water quality standards would be met. A Section 404(b) evaluation is included in this report as Appendix A. A public notice was issued on February 3, 2000 that will satisfy the requirements of Section 404 of the Clean Water Act.

6.6 CLEAN AIR ACT OF 1972

Refer to Section 4.9 in the EA for a discussion on the compliance with the Clean Air Act General Conformity Rules. No air quality permits would be required for this project. This project has been coordinated with U.S. Environmental Protection Agency (EPA) and is in compliance with Section 309 of the Act. The draft EA was forwarded to EPA for their review. Refer to EPA letter dated March 26, 2002 in Appendix C.

6.7 COASTAL ZONE MANAGEMENT ACT OF 1972

A federal consistency determination in accordance with 15 CFR 930 Subpart C is included in this report as Appendix B. State consistency review was conducted during the coordination of the draft EA. With the issuance of the State Water Quality Certification the project is consistent with the Florida Coastal Zone Management Program.

6.8 FARMLAND PROTECTION POLICY ACT OF 1981

No prime or unique farmland would be impacted by implementation of this project. This act is not applicable.

6.9 WILD AND SCENIC RIVER ACT OF 1968

No designated Wild and Scenic river reaches would be affected by project related activities. This act is not applicable.

6.10 MARINE MAMMAL PROTECTION ACT OF 1972

Incorporation of the safe guards used to protect threatened or endangered species during dredging and disposal operations would also protect any marine mammals in the area, therefore, this project is in compliance with the Act.

6.11 ESTUARY PROTECTION ACT OF 1968

No designated estuary would be affected by project activities. This act is not applicable.

6.12 FEDERAL WATER PROJECT RECREATION ACT

The principles of the Federal Water Project Recreation Act, (Public Law 89-72) as amended, have been fulfilled by complying with the recreation cost sharing criteria as outlined in Section 2 (a), paragraph (2). Another area of compliance includes the public beach access requirement on which the renourishment project hinges (Section 1, (b)).

6.13 FISHERY CONSERVATION AND MANAGEMENT ACT OF 1976

The project has been coordinated with the National Marine Fisheries Service (NMFS) and is in compliance with the act (refer to correspondence in Appendix C from NMFS).

6.14 SUBMERGED LANDS ACT OF 1953

The project would occur on submerged lands of the State of Florida. The project has been coordinated with the State and is in compliance with the act.

6.15 COASTAL BARRIER RESOURCES ACT & COASTAL BARRIER IMPROVEMENT ACT OF 1990

There are no designated coastal barrier resources in the project area that would be affected by this project. These acts are not applicable.

6.16 RIVERS AND HARBORS ACT OF 1899

The proposed work would not obstruct navigable waters of the United States. The proposed action has been subject to the public notice (February 3, 2000), with opportunity for a public hearing, and other evaluations normally conducted for activities subject to the act. The project is in full compliance.

6.17 ANADROMOUS FISH CONSERVATION ACT

Anadromous fish species would not be affected. The project has been coordinated with the National Marine Fisheries Service and is in compliance with the act.

6.18 MIGRATORY BIRD TREATY ACT AND MIGRATORY BIRD CONSERVATION ACT

No migratory birds would be affected by project activities. The project is in compliance with these acts.

6.19 MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT

The term "dumping" as defined in the Act (33 U.S.C. 1402)(f)) does not apply to the disposal of material for beach nourishment. Therefore, the Marine Protection, Research and Sanctuaries Act does not apply to this project. The disposal activities addressed in this EA have been evaluated under Section 404 of the Clean Water Act.

6.20 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

This Act requires the preparation of an Essential Fish Habitat (EFH) Assessment and coordination with NMFS. The EFH Assessment was integrated within the EA and was coordinated with NMFS during the coordination of the draft EA. Refer to NMFS letter dated April 4, 2002 and the Corps response dated May 1, 2002 in Appendix C.

6.21 E.O. 11990, PROTECTION OF WETLANDS

No wetlands would be affected by project activities. This project is in compliance with the goals of this Executive Order.

6.22 E.O. 11988, FLOOD PLAIN MANAGEMENT

The project is in the base flood plain (100-year flood) and has been evaluated in accordance with this Executive Order. Refer to Dade County Beaches, Florida, Beach Erosion Control and Hurricane Surge Protection, General Design Memorandum, Phase I, 1974. Project is in compliance.

6.23 E.O. 12898, ENVIRONMENTAL JUSTICE

The proposed action would not result in adverse human health or environmental effects, nor would the activity impact subsistence consumption of fish or wildlife. Project is in compliance.

6.24 E.O. 13089, CORAL REEF PROTECTION

The proposed action may affect U.S. coral reef ecosystems as defined in the Executive Order. Precautions would be implemented during construction to minimize impacts. Project is in compliance.

7. LIST OF PREPARERS

7.1 PREPARERS

This Environmental Assessment was prepared by the following personnel:

Preparer	Discipline	Role
Michael Dupes	Biology	Principal Writer
Thomas Birchett	Archeology	Historic Properties
Doug Rosen	Coastal Geology	Geotechnical Analysis

7.2 REVIEWERS

This Environmental Assessment was reviewed by Kenneth Dugger, Acting Chief, Environmental Branch.

8. PUBLIC INVOLVEMENT

8.1 SCOPING AND DRAFT EA

Scoping for the proposed action was initiated by a Public Notice dated February 3, 2000. The Public Notice was distributed to the appropriate Federal, State and Local agencies, appropriate city and county officials, and other parties known to be interested in the project. Copies of the Public Notice, the list of addressees used to distribute the notice, and letters of response are included in Appendix C, Pertinent Correspondence. A Notice of Availability (dated March 7, 2002) of the draft EA was prepared and sent to appropriate Federal, State and Local agencies, appropriate city and county officials, and other interested parties.

8.2 AGENCY COORDINATION

The draft EA was coordinated with the following agencies: U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Florida State Clearinghouse,

Florida State Historic Preservation Officer (SHPO), Florida Fish and Wildlife Conservation Commission, and the Florida Department of Environmental Protection.

8.3 COMMENTS RECEIVED

Letters of comment on the draft EA were received from the U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Environmental Protection Agency, Florida State Clearinghouse, Florida State Historic Preservation Officer (SHPO), Florida Fish and Wildlife Conservation Commission, the Florida Department of Environmental Protection and the South Florida Regional Planning Council. Copies of these letters can be found in Appendix C.

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APPENDIX A - SECTION 404(B) EVALUATION

SECTION 404(b) EVALUATION

**SECOND PERIODIC RENOURISHMENT
AT HAULOVER BEACH PARK
DADE COUNTY BEACH EROSION CONTROL
AND HURRICANE PROTECTION PROJECT
DADE COUNTY, FLORIDA**

I. Project Description

a. Location. The project is located in Dade County on the southeast coast of Florida. Haulover Beach Park is a County park bounded by Bakers Haulover Inlet to the south and the town of Sunny Isles to the north. The proposed work will be performed as a part of the Dade County Beach Erosion Control and Hurricane Protection Project. Refer to the project location map, figure 1, in the Environmental Assessment (EA).

b. General Description. The placement of about 114,000 cubic yards of material will be required along the beachfront at Haulover Beach Park. The fill will extend from the border with Sunny Isles southward approximately 2,600 feet. The construction berm width is 120 feet from the ECL at an elevation of +9 feet mean low water (MLW), with a construction tolerance of +/- 0.5 feet. The front slope of the fill will be 1 vertical on 10 horizontal (refer to figure 2, project plan view and figure 3, typical beach profile in EA). The proposed borrow area is located within the ebb shoal northeast of Bakers Haulover Inlet in 10 to 20 feet of water (figures 1 & 4 in EA).

c. Authority and Purpose. Initial authorization came from the Flood Control Act of 1968 authorization of the Beach Erosion Control and Hurricane Protection (BEC & HP) Project for Dade County, Florida. In addition, Section 69 of the 1974 Water Resources Act (P.L. 93-251 dated 7 March 1974) included the initial construction by non-Federal interests of the 0.85 mile segment along Bal Harbour Village, immediately south of Bakers Haulover Inlet. The authorized project, as described in HD 335/90/2, provided for the construction of a protective/recreational beach and a protective dune for 9.3 miles of shoreline between Government Cut and Baker's Haulover Inlet (encompassing Miami Beach, Surfside and Bal Harbour) and for the construction of a protective/recreational beach along the 1.2 miles of shoreline at Haulover Beach Park. The Supplemental Appropriations Act of 1985 and the Water Resources Development Act of 1986 (Public Law 99-662) provided authority for extending the northern limit of the authorized project to include the construction of a protective beach along the 2.5 mile reach of shoreline north of Haulover Beach Park (Sunny Isles) and for periodic nourishment of the new beach. This authority also provided for the extension of the period of Federal participation in the cost of nourishing the authorized 1968 BEC & HP Project for Dade County, which covered 10.5 miles of shoreline extending from Government Cut north to the northern boundary of Haulover Beach Park, from 10 years to the 50-year life of the project.

Nourishment of Dade County Beaches has become a necessity to provide storm protection. The purpose of the project is to prevent or reduce loss of public beach front to continuing erosional forces and to prevent or reduce periodic damages and potential risk to life, health, and property in the developed lands adjacent to the beach.

d. General Description of Dredged or Fill Material.

(1) General Characteristics of Material. The material to be excavated is generally light gray to tan, poorly graded shelly sand with a trace of silt and gravel sized shell fragments. The composite mean grain size of the borrow area is 0.54 mm. The silt content ranges from 0.2 to 13.3 percent with an average of 2.7 percent. Large carbonate rock fragments do not occur in the borrow area; therefore, rock removal will not be required.

(2) Quantity of Material. The amount material needed for the 2,600-foot length of beach to be renourished is estimated at 114,000 cubic yards.

(3) Source of Material. The proposed borrow area for this renourishment is the ebb shoal at Bakers Haulover Inlet. The area is located approximately 2,000 feet offshore, and just northeast of the inlet in 10 to 20 feet of water (figures 1 & 4 in EA).

e. Description of the Proposed Construction Site.

(1) Location. The location of the beach fill is the northern 2,600 feet of Haulover Beach Park, Dade County, Florida. Refer to figure 2 in EA.

(2) Size. The proposed fill is approximately 2,600 feet long with a berm width of 120 feet.

(3) Type of Site. The site for disposal of the sand material is a segment of eroded, sandy, recreational beach and inshore seabed.

(4) Type of Habitat. The beach disposal area consists of a currently eroding carbonate and quartz sand beach and inshore seabed. The borrow area is characterized by a sandy bottom. There are no known seagrass beds or hardgrounds in the borrow area.

(5) Timing and Duration of Dredging. The exact timing of nourishment is not known. It is anticipated that construction will occur during the fall/winter of 2002.

f. Description of Disposal Method. It is anticipated that the material will be obtained from the ebb shoal borrow area using a hydraulic pipeline dredge. Once the material is pumped on the beach, grading will be performed using construction equipment to achieve the desired construction profile.

II. Factual Determinations

a. Physical Substrate Determinations.

(1) Substrate Elevation and Slope. The beach fill will be constructed with a berm elevation of +9.0 feet MWL and a width of 120 feet from the ECL. The front slope of the beach fill will be 1 vertical on 10 horizontal. Refer to figure 3 in the EA.

(2) Type of Fill Material. Sand from the borrow area has a high carbonate (shell) content and ranges in size from fine to coarse.

(3) Dredge/Fill Material Movement. The fill material will be subject to erosion by waves with the net movement of fill material to the south.

(4) Physical Effects on Benthos. Some benthic organisms that are not mobile may be lost during dredging and may be covered by the beach fill. Recolonization soon after project completion is expected to replace those organisms that do not survive project construction. It is anticipated that no long-term adverse impacts will occur.

b. Water Circulation, Fluctuation and Salinity Determination.

(1) Water Column Effects. During dredging and beach fill operations, turbidity will increase temporarily in the water column. The increased turbidity will be short-term; therefore fill placement will have no long-term or significant impacts, if any, on salinity, water chemistry, clarity, color, odor, taste, dissolved gas levels, nutrients or eutrophication.

(2) Current Patterns and Circulation. Net movement of water is from the north to the south. The project will have no significant effect on existing current patterns, current flow, velocity, stratification, or the hydrologic regime in the area.

(3) Normal Water Level Fluctuations and Salinity Gradients. Mean tidal range in the project area is 3.5 feet with a spring tide range of approximately 4.1 feet. Salinity is that of oceanic water. Fill placement will not affect normal tide fluctuations or salinity.

c. Suspended Particulate/Turbidity Determinations.

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Site. There may be a temporary increase in turbidity levels in the project area during dredging and along the beach fill sites during discharge. Turbidity will be short-term and localized and no significant adverse impacts are expected. State water quality standards for turbidity outside an allowable mixing zone will not be exceeded.

(2) Effects on the Chemical and Physical Properties of the Water Column. The sea floor at this location is characterized by a large sandy shoal. There would be little, if any adverse effects to chemical and physical properties of the water as a result of the use of the proposed borrow area.

(a) Light Penetration. Some decrease in light penetration may occur in the immediate vicinity of the dredging and beach fill areas. This effect will be temporary, limited to the immediate area of construction, and will have no adverse impact on the environment.

(b) Dissolved Oxygen. Dissolved oxygen levels will not be altered by this project due to the high energy wave environment and associated adequate reaeration rates.

(c) Toxic Metals, Organics, and Pathogens. No toxic metals, organics, or pathogens are expected to be released by the project.

(d) Aesthetics. The aesthetic quality of the water in the immediate area of the project will be reduced during construction due to increased turbidity. This will be a short-term and localized condition. The placement of clean beach compatible sand on an erosive beach will likely improve the aesthetic quality of the immediate area.

(3) Effects on Biota.

(a) Primary Productivity and Photosynthesis. Primary productivity is not a recognized, significant phenomenon in the surf zone, where a temporarily increased level of suspended particulates will occur. There will be no effect on the nearshore productivity as a result of the proposed beach fill.

(b) Suspension/Filter Feeders. An increase in turbidity could adversely impact burrowing invertebrate filter feeders within and adjacent to the immediate construction area. It is not expected that a short-term, temporary increase in turbidity will have any long-term negative impact on these highly fecund organisms.

(c) Sight Feeders. No significant impacts on these organisms are expected as the majority of sight feeders are highly motile and can move outside the project area.

d. Contaminant Determinations. Material which will be dredged from the proposed borrow site will not introduce, relocate, or increase contaminants at the fill area. The material is clean sand compatible with the existing beach.

e. Aquatic Ecosystem and Organism Determinations. The fill material that will be dredged from the proposed borrow area and used in the beach erosion control project is similar enough to the

existing substrate so that no impacts are expected. The materials meet the exclusion criteria, therefore, no additional chemical-biological interactive testing will be required.

(1) Effects on Plankton. No adverse impacts on autotrophic or heterotrophic organisms are anticipated.

(2) Effects on Benthos. Some benthic organisms will be buried by the beach fill. Benthic organisms found in the intertidal areas along the project beach are adapted for existence in an area with considerable substrate movement, thus most will be able to burrow up through the fill material. Recolonization is expected to occur within a year after construction activities cease. No adverse long-term impacts to non-motile or motile benthic invertebrates are anticipated. Similar impacts to benthic organisms within the area to be dredged are expected.

(3) Effects on Nekton. No adverse impacts to nektonic species are anticipated.

(4) Effects on the Aquatic Food Web. No adverse long-term impact to any trophic group in the food web is anticipated.

(5) Effects on Special Aquatic Sites.

(a) Hardground and Coral Reef Communities. There are no hardground or coral reef communities located in the immediate nearshore area that would be impacted by beach fill activities.

(6) Endangered and Threatened Species. There will be no significant adverse impacts on any threatened or endangered species or on critical habitat of any threatened or endangered species. Refer to Section 5.0 in the EA for measures that will be implemented to protect endangered and threatened species.

(7) Other Wildlife. No adverse impacts to small foraging mammals, reptiles, or wading birds, or wildlife in general are expected.

(8) Actions to Minimize Impacts. All practical safeguards will be taken during construction to preserve and enhance environmental, aesthetic, recreational, and economic values in the project area. Specific precautions are discussed elsewhere in this 404(b) evaluation and in the EA for this project (refer to Sections 4.0 and 5.0 in the EA).

f. Proposed Disposal Site Determinations.

(1) Mixing Zone Determination. Clean sand, compatible with the existing beach, would be placed on the beach. This will not cause unacceptable changes in the mixing zone water quality requirements as specified by the State of Florida's Water Quality Certification permit procedures. No adverse impacts related to depth, current velocity, direction and variability, degree of turbulence, stratification, or ambient concentrations of constituents are expected from implementation of the project.

(2) Determination of Compliance with Applicable Water Quality Standards. Because of the inert nature of the material to be dredged, Class III water quality standards will not be violated.

(3) Potential Effects on Human Use Characteristics.

(a) Municipal and Private Water Supplies. No municipal or private water supplies will be impacted by the implementation of the project.

(b) Recreational and Commercial Fisheries. Fishing in the immediate construction area will be prohibited during construction. Otherwise, recreational and commercial fisheries will not be impacted by the implementation of the project.

(c) Water Related Recreation. Beach/water related recreation in the immediate vicinity of construction will be prohibited during construction activities. This will be a short-term impact.

(d) Aesthetics. The existing environmental setting will not be adversely impacted. Construction activities will cause a temporary increase in noise and air pollution caused by equipment as well as some temporary increase in turbidity. These impacts are not expected to adversely affect the aesthetic resources over the long term and once construction ends, conditions will return to pre-project levels.

(e) Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves. The beach renourishment will take place at Haulover Beach Park, which is a county park. No other such designated sites are located within the project area.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. There will be no cumulative impacts that result in a major impairment of water quality of the existing aquatic ecosystem as a result of the placement of fill at the project site.

h. Determination of Secondary Effects on the Aquatic Ecosystem. There will be no secondary impacts on the aquatic ecosystem as a result of the dredging.

III. Findings of Compliance or Non-compliance with the Restrictions on Discharge.

a. No significant adaptations of the guidelines were made relative to this evaluation.

b. No practicable alternative exists which meets the study objectives that does not involve discharge of fill into waters of the United States. Further, no less environmentally damaging practical alternatives to the proposed actions (use of the proposed borrow site) exist. The use of upland and or other sand sources would cause the cost of hauling and/or bulk purchase price to be significantly higher than the use of the proposed borrow site. In addition, the impacts of using other sources on cultural resources, protected species, and other environmental factors would likely be equal to or greater than the impacts of the proposed action. The no action alternative would allow the present condition of the shoreline to continue and would not provide the benefits needed for storm damage protection.

c. After consideration of disposal site dilution and dispersion, the discharge of fill materials will not cause or contribute to, violations of any applicable State water quality standards for Class III waters. The discharge operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

d. The dredging of and disposal of dredged materials for beach construction will not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973, as amended. Standard conditions for monitoring and relocating turtle nests would be employed.

e. The dredging and placement of fill material will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreational and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic species and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values will not occur.

f. Appropriate steps have been taken to minimize the adverse environmental impact of the proposed action. The proposed borrow area has low silt content, therefore, turbidity due to silt will be low when dredging and discharging. Turbidity will be monitored so that if levels exceed State water quality standards of 29 NTU's above background, the contractor will be required to cease work until conditions return to normal. In the vicinity of reef and other hard grounds, measures would be taken to minimize sediment deposition on sensitive reef organisms.

g. On the basis of the guidelines, the proposed dredging and disposal sites are specified as complying with the requirements of these guidelines.

APPENDIX B - COASTAL ZONE MANAGEMENT CONSISTENCY

FLORIDA COASTAL ZONE MANAGEMENT PROGRAM FEDERAL CONSISTENCY EVALUATION PROCEDURES

SECOND PERIODIC RENOURISHMENT AT HAULOVER BEACH PARK DADE COUNTY BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT DADE COUNTY, FLORIDA

1. Chapter 161, Beach and Shore Preservation. The intent of the coastal construction permit program established by this chapter is to regulate construction projects located seaward of the line of mean high water and which might have an effect on natural shoreline processes.

Response: The proposed plans and information will be submitted to the state in compliance with this chapter.

2. Chapters 186 and 187, State and Regional Planning. These chapters establish the State Comprehensive Plan which sets goals that articulate a strategic vision of the State's future. It's purpose is to define in a broad sense, goals, and policies that provide decision-makers directions for the future and provide long-range guidance for an orderly social, economic and physical growth.

Response: The proposed project has been coordinated with various Federal, State and local agencies during the planning process. The project meets the primary goal of the State Comprehensive Plan through preservation and protection of the shorefront development and infrastructure.

3. Chapter 252, Disaster Preparation, Response and Mitigation. This chapter creates a state emergency management agency, with the authority to provide for the common defense; to protect the public peace, health and safety; and to preserve the lives and property of the people of Florida.

Response: The proposed project involves placing beach compatible material onto an eroding beach as a protective means for development and infrastructure located along the Atlantic shoreline within Haulover Beach Park in Dade County, Florida. Therefore, this project would be consistent with the efforts of Division of Emergency Management.

4. Chapter 253, State Lands. This chapter governs the management of submerged state lands and resources within state lands. This includes archeological and historical resources; water resources; fish and wildlife resources; beaches and dunes; submerged grass beds and other benthic communities; swamps, marshes and other wetlands; mineral resources; unique natural features; submerged lands; spoil islands; and artificial reefs.

Response: The proposed beach nourishment would create increased recreational beach and potential sea turtle nesting habitat. No seagrass beds are located within the area proposed to receive fill. Buffer zones will be used to protect hardbottom communities near the borrow area. Buffer zones will also be used to protect potentially significant magnetic anomalies identified in the vicinity of the borrow areas. The proposed project would comply with the intent of this chapter.

5. Chapters 253, 259, 260, and 375, Land Acquisition. This chapter authorizes the state to acquire land to protect environmentally sensitive areas.

Response: Since the affected property already is in public ownership, this chapter does not apply.

6. Chapter 258, State Parks and Aquatic Preserves. This chapter authorizes the state to manage state parks and preserves. Consistency with this statute would include consideration of projects that would directly or indirectly adversely impact park property, natural resources, park programs, management or operations.

Response: The proposed project area does not contain any state parks or aquatic preserves. The project is consistent with this chapter.

7. Chapter 267, Historic Preservation. This chapter establishes the procedures for implementing the Florida Historic Resources Act responsibilities.

Response: This project has been coordinated with the State Historic Preservation Officer (SHPO). Historic Property investigations were conducted in the project area. An archival and literature search, in addition to a magnetometer survey of the proposed borrow area were conducted. No known historic properties are located on the segment of beach to be renourished. The SHPO concurred with the Corps determination that the proposed project will not adversely affect any significant cultural or historic resources. The project will be consistent with the goals of this chapter.

8. Chapter 288, Economic Development and Tourism. This chapter directs the state to provide guidance and promotion of beneficial development through encouraging economic diversification and promoting tourism.

Response: The proposed beach nourishment would protect the beach at Haulover Beach Park. The larger beach, as a result of this project, will attract tourists by providing additional space for recreation and more protection to recreational facilities along the beach. This would be compatible with tourism for this area and therefore, is consistent with the goals of this chapter.

9. Chapters 334 and 339, Public Transportation. This chapter authorizes the planning and development of a safe balanced and efficient transportation system.

Response: No public transportation systems would be impacted by this project.

10. Chapter 370, Saltwater Living Resources. This chapter directs the state to preserve, manage and protect the marine, crustacean, shell and anadromous fishery resources in state waters; to protect and enhance the marine and estuarine environment; to regulate fishermen and vessels of the state engaged in the taking of such resources within or without state waters; to issue licenses for the taking and processing products of fisheries; to secure and maintain statistical records of the catch of each such species; and, to conduct scientific, economic, and other studies and research.

Response: The proposed beach fill may cause a temporary short-term impact to infaunal invertebrates from increased turbidity and/or direct burial of these organisms. However, these organisms are highly adapted to the periodic burial by sand in the intertidal zone. These organisms are highly fecund and are expected to return to pre-construction levels within 6 months to one year after construction. No adverse impacts to marine fishery resources are expected. It is not expected that sea turtles would be significantly impacted by this project. Based on the overall impacts of the project, the project is consistent with the goals of this chapter.

11. Chapter 372, Living Land and Freshwater Resources. This chapter establishes the Game and Freshwater Fish Commission and directs it to manage freshwater aquatic life and wild animal life and their habitat to perpetuate a diversity of species with densities and distributions, which provide sustained ecological, recreational, scientific, educational, aesthetic, and economic benefits.

Response: The project will have no effect on freshwater aquatic life or wild animal life.

12. Chapter 373, Water Resources. This chapter provides the authority to regulate the withdrawal, diversion, storage, and consumption of water.

Response: This project does not involve water resources as described by this chapter.

13. Chapter 376, Pollutant Spill Prevention and Control. This chapter regulates the transfer, storage, and transportation of pollutants and the cleanup of pollutant discharges.

Response: The contract specifications will prohibit the contractor from dumping oil, fuel, or hazardous wastes in the work area and will require that the contractor adopt safe and sanitary measures for the disposal of solid wastes. A spill prevention plan will be required.

14. Chapter 377, Oil and Gas Exploration and Production. This chapter authorizes the regulation of all phases of exploration, drilling, and production of oil, gas, and other petroleum products.

Response: This project does not involve the exploration, drilling or production of gas, oil or petroleum product and therefore, this chapter does not apply.

15. Chapter 380, Environmental Land and Water Management. This chapter establishes criteria and procedures to assure that local land development decisions consider the regional impact nature of proposed large-scale development.

Response: The proposed renourishment project will not have any regional impact on resources in the area. Therefore, the project is consistent with the goals of this chapter.

16. Chapter 388, Arthropod Control. This chapter provides for a comprehensive approach for abatement or suppression of mosquitoes and other pest arthropods within the state.

Response: The project will not further the propagation of mosquitoes or other pest arthropods.

17. Chapter 403, Environmental Control. This chapter authorizes the regulation of pollution of the air and waters of the state by the Florida Department of Environmental Regulation (now a part of the Florida Department of Environmental Protection).

Response: A Draft Environmental Assessment addressing project impacts has been prepared and will be reviewed by the appropriate resource agencies including the Florida Department of Environmental Protection. Environmental protection measures will be implemented to ensure that no lasting adverse effects on water quality, air quality, or other environmental resources will occur. Water Quality Certification (Permit No. 0128781-00-JC) has been issued by FDEP for this project. The project complies with the intent of this chapter.

18. Chapter 582, Soil and Water Conservation. This chapter establishes policy for the conservation of the state soil and water through the Department of Agriculture. Land use policies will be evaluated in terms of their tendency to cause or contribute to soil erosion or to conserve, develop, and utilize soil and

water resources both onsite or in adjoining properties affected by the project. Particular attention will be given to projects on or near agricultural lands.

Response: The proposed project is not located near or on agricultural lands; therefore, this chapter does not apply.

APPENDIX C - PERTINENT CORRESPONDENCE



United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
1339 20th Street
Vero Beach, Florida 32960



May 17, 2002

Colonel James G. May
U.S. Army Corps of Engineers
Jacksonville District
Post Office Box 4970
Jacksonville, Florida 32232-0019

Service Log No.: 4-1-02-I-280
Dated: February 3, 2000
Project: Haulover Beach Park
Sponsor: Miami-Dade County

Dear Colonel May:

This document is the Fish and Wildlife Service's (Service) Biological Opinion based on our review of the proposed Second Periodic Renourishment at Haulover Beach Park in Miami-Dade County, Florida. Our review also includes the project effects on the federally-listed threatened loggerhead sea turtle (*Caretta caretta*), endangered green sea turtle (*Chelonia mydas*), endangered leatherback sea turtle (*Dermochelys coriacea*), and endangered hawksbill sea turtle (*Eretmochelys imbricata*), in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

This Biological Opinion is based on information provided in the Public Notice and the Draft Environmental Assessment for the proposed project, as well as field investigations, meetings, letter correspondence, e-mail correspondence, and phone conversations with the U.S. Army Corps of Engineers (Corps), Miami-Dade County Department of Environmental Resources Management (DERM), the National Marine Fisheries Service (NMFS), the Florida Fish and Wildlife Conservation Commission (FWC), and other sources of information. A complete administrative record of this consultation is on file at the South Florida Ecological Services Office in Vero Beach, Florida.

CONSULTATION HISTORY

On February 3, 2000, the Corps Public Notice stated that consultation with the Service pursuant to the ESA was ongoing for the proposed action. The Corps stated that they would consider recommendations from the Service for purposes of compliance with the ESA and that project effects to the manatee, marine turtles, and other species would be addressed.

On February 14, 2002, by telephone, the Service requested a determination from the Corps on threatened and endangered species.

On February 15, 2002, the Corps faxed a letter dated February 29, 2000, referring to the programmatic Biological Opinion dated October 24, 1996, for Region III of the Coast of Florida Erosion and Storm Effects Study (COFS). The Haulover Beach Park project area is considered under the COFS. The Corps stated that the reasonable and prudent measures, and terms and conditions listed in the Biological Opinion would apply to the proposed renourishment.

On February 21, 2002, in a telephone conversation with the Corps, the Service requested a determination on affected threatened and endangered species. The Corps stated that, through the COFS Biological Opinion, they have determined that the project may affect threatened and endangered sea turtles.

On May 15, 2002, the Corps provided the Service with a revised determination of “may affect, not likely to adversely affect” for the West Indian manatee, based on implementing the *Standard Manatee Protection Construction Conditions*.

The Service concurs with the Corps determination of “may affect, not likely to adversely affect” the West Indian manatee, with implementation of the *Standard Manatee Protection Construction Conditions*. The Service also concurs with the Corps determination of “may affect” for the loggerhead, green, leatherback, and hawksbill sea turtles. As a note, the Service has revised the general biological opinion template and procedures since the release of the COFS Biological Opinion. Therefore, this Biological Opinion will supercede the 1996 Biological Opinion for threatened and endangered sea turtles.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Corps proposes to construct a berm 120 feet wide with a 10:1 slope along 2,600 feet of shoreline, covering approximately 7.2 acres from Florida Department of Environmental Protection (DEP) monument R-19 to R-22 (Corps 2002). An estimated 114,000 cubic yards of material will be obtained from the shoal of Baker’s Haulover Inlet. The shoal is located approximately 2,000 feet seaward from the Inlet, in a water depth of 10 to 20 feet. The borrow

area comprises approximately half of the Baker's Haulover Inlet shoal. After the dredging operation, the remaining portions of the shoal will still provide wave refraction to minimize impacts to adjacent shore processes. Due to the short distance from the beach to the borrow area, a hydraulic pipeline and a non-hopper barge will be used to acquire and deliver the substrate.

The excavated material is generally light gray to tan and poorly graded shelly sand with a trace of silt and gravel-sized shell fragments. The composite mean grain size of the borrow area is less than 1 millimeter with an average composite silt content of 2.7 percent. This site will not require rock removal, because large carbonate rock fragments do not occur within the borrow area. The borrow area contains suitable beach nourishment material.

Sections of beach in the City of Miami Beach, Florida were initially nourished in 1978, and renourished in 1980, 1987, 1994, 1997, and again scheduled for renourishment again in 2002. Haulover Beach Park was last renourished in 1994 as part of the overall efforts (Corps 2001). The Corps believes that the renourishment of Miami-Dade County beaches has become a necessity in providing storm protection. The Corps' project purpose for Haulover Park renourishment is to prevent and reduce loss of public beachfront to continuing erosional forces and to prevent and reduce periodic damages and potential risk to life, health, and property in the developed lands adjacent to the beach. The Corps believes that continual beach erosion has resulted in the loss of nesting habitat for listed sea turtles. Storm impacts from Hurricane Andrew in 1992, Hurricane Gordon in 1994, and the winter storms of 1996 to Haulover Beach have increased the need for renourishment.

STATUS OF THE SPECIES/CRITICAL HABITAT

Species/critical habitat description

Loggerhead Sea Turtle

The loggerhead sea turtle, listed as a threatened species on July 28, 1978 (43 FR 32800), inhabits the continental shelves and estuarine environments along the margins of the Atlantic, Pacific, and Indian Oceans. Loggerhead sea turtles nest within the continental U.S. from Louisiana to Virginia. Major nesting concentrations in the U.S. are found on the coastal islands of North Carolina, South Carolina, and Georgia, and on the Atlantic and Gulf coasts of Florida (Hopkins and Richardson 1984).

No critical habitat has been designated for the loggerhead sea turtle.

Green Sea Turtle

The green sea turtle was federally listed as a protected species on July 28, 1978 (43 FR 32800). Breeding populations of the green turtle in Florida and along the Pacific Coast of Mexico are listed as endangered; all other populations are listed as threatened. The green turtle has a

worldwide distribution in tropical and subtropical waters. Major green turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Within the U.S., green turtles nest in small numbers in the U.S. Virgin Islands and Puerto Rico, and in larger numbers along the east coast of Florida, particularly in Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a). Nesting also has been documented along the Gulf coast of Florida on Santa Rosa Island (Okaloosa and Escambia Counties) and from Pinellas County through Collier County (Florida Department of Environmental Protection, unpublished data). Green turtles have been known to nest in Georgia, but only on rare occasions (Georgia Department of Natural Resources, unpublished data). The green turtle also nests sporadically in North Carolina and South Carolina (North Carolina Wildlife Resources Commission, unpublished data; South Carolina Department of Natural Resources, unpublished data). Unconfirmed nesting of green turtles in Alabama has also been reported (Bon Secour National Wildlife Refuge, unpublished data).

Critical habitat for the green sea turtle has been designated for the waters surrounding Culebra Island, Puerto Rico, and its outlying keys.

Leatherback Sea Turtle

The leatherback sea turtle, listed as an endangered species on June 2, 1970 (35 FR 8491), nests on shores of the Atlantic, Pacific and Indian Oceans. Non-breeding animals have been recorded as far north as the British Isles and the Maritime Provinces of Canada and as far south as Argentina and the Cape of Good Hope (Pritchard 1992). Nesting grounds are distributed worldwide, with the Pacific Coast of Mexico supporting the world's largest known concentration of nesting leatherbacks. The largest nesting colony in the wider Caribbean region is found in French Guiana, but nesting occurs frequently, although in lesser numbers, from Costa Rica to Columbia and in Guyana, Surinam, and Trinidad (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992, National Research Council 1990a).

The leatherback regularly nests in the U.S. in Puerto Rico, the U.S. Virgin Islands, and along the Atlantic coast of Florida as far north as Georgia (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992). Leatherback turtles have been known to nest in Georgia, South Carolina, and North Carolina, but only on rare occasions (Murphy 1996, Winn 1996, Boettcher 1998). Leatherback nesting also has been reported on the northwest coast of Florida (LeBuff 1990; Florida Department of Environmental Protection, unpublished data); a false crawl (non-nesting emergence) has been observed on Sanibel Island (LeBuff 1990).

Marine and terrestrial critical habitat for the leatherback sea turtle has been designated at Sandy Point on the western end of the island of St. Croix, U.S. Virgin Islands.

Hawksbill Sea Turtle

The hawksbill sea turtle was listed as an endangered species on June 2, 1970 (35 FR 8491). The hawksbill is found in tropical and subtropical seas of the Atlantic, Pacific, and Indian Oceans. The species is widely distributed in the Caribbean Sea and western Atlantic Ocean. Within the continental U.S., hawksbill sea turtle nesting is rare and is restricted to the southeastern coast of Florida (Volusia through Dade Counties) and the Florida Keys (Monroe County) (Meylan 1992, Meylan *et al.* 1995). However, hawksbill tracks are difficult to differentiate from those of loggerheads and may not be recognized by surveyors. Therefore, surveys in Florida likely underestimate actual hawksbill nesting numbers (Meylan *et al.* 1995). In the U.S. Caribbean, hawksbill nesting occurs on beaches throughout Puerto Rico and the U.S. Virgin Islands (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1993).

Critical habitat for the hawksbill sea turtle has been designated for selected beaches and/or waters of Mona, Monito, Culebrita, and Culebra Islands, Puerto Rico.

Life history

Loggerhead Sea Turtle

Loggerheads are known to nest from one to seven times within a nesting season (Talbert *et al.* 1980, Richardson and Richardson 1982, Lenarz *et al.* 1981, among others); the mean is approximately 4.1 (Murphy and Hopkins 1984). The interval between nesting events within a season varies around a mean of about 14 days (Dodd 1988). Mean clutch size varies from about 100 to 126 along the southeastern United States coast (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b). Nesting migration intervals of 2 to 3 years are most common in loggerheads, but the number can vary from 1 to 7 years (Dodd 1988). Age at sexual maturity is believed to be about 20 to 30 years (Turtle Expert Working Group 1998).

Green Sea Turtle

Green turtles deposit from one to nine clutches within a nesting season, but the overall average is about 3.3. The interval between nesting events within a season varies around a mean of about 13 days (Hirth 1997). Mean clutch size varies widely among populations. Average clutch size reported for Florida was 136 eggs in 130 clutches (Witherington and Ehrhart 1989). Only occasionally do females produce clutches in successive years. Usually 2, 3, 4, or more years intervene between breeding seasons (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991a). Age at sexual maturity is believed to be 20 to 50 years (Hirth 1977).

Leatherback Sea Turtle

Leatherbacks nest an average of five to seven times within a nesting season, with an observed maximum of 11 (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1992).

The interval between nesting events within a season is about 9 to 10 days. Clutch size averages 101 eggs on Hutchinson Island, Florida (Martin 1992). Nesting migration intervals of 2 to 3 years were observed in leatherbacks nesting on the Sandy Point National Wildlife Refuge, St. Croix, U.S. Virgin Islands (McDonald and Dutton 1996). Leatherbacks are believed to reach sexual maturity in 6 to 10 years (Zug and Parham 1996).

Hawksbill Sea Turtle

Hawksbills nest on average about 4.5 times per season at intervals of approximately 14 days (Corliss *et al.* 1989). In Florida and the U.S. Caribbean, clutch size is approximately 140 eggs, although several records exist of over 200 eggs per nest (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1993). On the basis of limited information, nesting migration intervals of 2 to 3 years appear to predominate. Hawksbills are recruited into the reef environment at about 14 inches in length and are believed to begin breeding about 30 years later. However, the time required to reach 14 inches in length is unknown and growth rates vary geographically. As a result, actual age at sexual maturity is not known.

Population dynamics

Loggerhead Sea Turtle

Total estimated nesting in the Southeast is approximately 50,000 to 70,000 nests per year (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b). In 1998, there were over 80,000 nests in Florida alone. From a global perspective, the southeastern U.S. nesting aggregation is of paramount importance to the survival of the species and is second in size only to that which nests on islands in the Arabian Sea off Oman (Ross 1982, Ehrhart 1989, National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b). The status of the Oman colony has not been evaluated recently, but its location in a part of the world that is vulnerable to disruptive events (e.g., political upheavals, wars, catastrophic oil spills) is cause for considerable concern (Meylan *et al.* 1995). The loggerhead nesting aggregations in Oman, the southeastern U.S., and Australia account for about 88 percent of nesting worldwide (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b). About 80 percent of loggerhead nesting in the southeastern U.S. occurs in six Florida counties (Brevard, Indian River, St. Lucie, Martin, Palm Beach, and Broward Counties) (National Marine Fisheries Service and U.S. Fish and Wildlife Service 1991b).

Green Sea Turtle

About 200 to 1,100 females are estimated to nest on beaches in the continental U.S. In the U.S. Pacific, over 90 percent of nesting throughout the Hawaiian archipelago occurs at the French Frigate Shoals, where about 200 to 700 females nest each year. Elsewhere in the U.S. Pacific, nesting takes place at scattered locations in the Commonwealth of the Northern Marianas, Guam, and American Samoa. In the western Pacific, the largest green turtle nesting aggregation in the

world occurs on Raine Island, Australia, where thousands of females nest nightly in an average nesting season. In the Indian Ocean, major nesting beaches occur in Oman where 6,000 to 20,000 females are reported to nest annually.

Leatherback Sea Turtle

Recent estimates of global nesting populations indicate 26,000 to 43,000 nesting females annually (Spotila *et al.* 1996). The largest nesting populations at present occur in the western Atlantic in French Guiana (4,500 to 7,500 females nesting/year) and Colombia (estimated several thousand nests annually), and in the western Pacific in West Papua (formerly Irian Jaya) and Indonesia (about 600 to 650 females nesting/year). In the United States, small nesting populations occur on the Florida east coast (35 females/year), Sandy Point, U.S. Virgin Islands (50 to 100 females/year), and Puerto Rico (30 to 90 females/year).

Hawksbill Sea Turtle

About 15,000 females are estimated to nest each year throughout the world with the Caribbean accounting for 20 to 30 percent of the world's hawksbill population. Only five regional populations remain with more than 1,000 females nesting annually (Seychelles, Mexico, Indonesia, and two in Australia). Mexico is now the most important region for hawksbills in the Caribbean with 3,000 to 4,500 nests/year. Other significant but smaller populations in the Caribbean still occur in Martinique, Jamaica, Guatemala, Nicaragua, Grenada, Dominican Republic, Turks and Caicos Islands, Cuba, Puerto Rico, and U.S. Virgin Islands. In the U.S. Caribbean, about 100 to 350 nests/year are laid on Mona Island, Puerto Rico, and 60 to 120 nests/year on Buck Island Reef National Monument, U.S. Virgin Islands. In the U.S. Pacific, hawksbills nest only on main island beaches in Hawaii, primarily along the east coast of the island of Hawaii. Hawksbill nesting has also been documented in American Samoa and Guam.

Status and distribution

Loggerhead Sea Turtle

Genetic research (mtDNA) has identified four loggerhead nesting subpopulations in the western North Atlantic: (1) the Northern Subpopulation occurring from North Carolina to around Cape Canaveral, Florida (about 29° N.); (2) South Florida Subpopulation occurring from about 29° N. on Florida's east coast to Sarasota on Florida's west coast; (3) Northwest Florida Subpopulation occurring at Eglin Air Force Base and the beaches near Panama City; and (4) Yucatán Subpopulation occurring on the eastern Yucatán Peninsula, Mexico (Bowen 1994, 1995; Bowen *et al.* 1993; Encalada *et al.* 1998). These data indicate that gene flow between these four regions is very low. If nesting females are extirpated from one of these regions, regional dispersal will not be sufficient to replenish the depleted nesting Subpopulation. The Northern Subpopulation has declined substantially since the early 1970s, but most of that decline occurred prior to 1979. No significant trend has been detected in recent years (Turtle Expert Working Group 1998,

2000). Adult loggerheads of the South Florida Subpopulation have shown significant increases over the last 25 years, indicating that the population is recovering, although a trend could not be detected from the State of Florida's Index Nesting Beach Survey program from 1989 to 1998. Nesting surveys in the Northwest Florida and Yucatán Subpopulations have been too irregular to date to allow for a meaningful trend analysis (Turtle Expert Working Group 1998, 2000).

Threats include incidental take from channel dredging and commercial trawling, longline, and gill net fisheries; loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and disease. There is particular concern about the extensive incidental take of juvenile loggerheads in the eastern Atlantic by longline fishing vessels from several countries.

Green Sea Turtle

Total population estimates for the green turtle are unavailable, and trends based on nesting data are difficult to assess because of large annual fluctuations in numbers of nesting females. For instance, in Florida, where the majority of green turtle nesting in the southeastern U.S. occurs, estimates range from 200 to 1,100 females nesting annually. Populations in Surinam, and Tortuguero, Costa Rica, may be stable, but there is insufficient data for other areas to confirm a trend.

A major factor contributing to the green turtle's decline worldwide is commercial harvest for eggs and food. Fibropapillomatosis, a disease of sea turtles characterized by the development of multiple tumors on the skin and internal organs, is also a mortality factor and has seriously impacted green turtle populations in Florida, Hawaii, and other parts of the world. The tumors interfere with swimming, eating, breathing, vision, and reproduction, and turtles with heavy tumor burdens may die. Other threats include loss or degradation of nesting habitat from coastal development and beach armoring; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; watercraft strikes; and incidental take from channel dredging and commercial fishing operations.

Leatherback Sea Turtle

Declines in leatherback nesting have occurred over the last two decades along the Pacific coasts of Mexico and Costa Rica. The Mexican leatherback nesting population, once considered to be the world's largest leatherback nesting population (65 percent of worldwide population), is now less than one percent of its estimated size in 1980. Spotila *et al.* (1996) recently estimated the number of leatherback sea turtles nesting on 28 beaches throughout the world from the literature and from communications with investigators studying those beaches. The estimated worldwide population of leatherbacks in 1995 was about 34,500 females on these beaches with a lower limit of about 26,200 and an upper limit of about 42,900. This is less than one third the 1980 estimate

of 115,000. Leatherbacks are rare in the Indian Ocean and in very low numbers in the western Pacific Ocean. The largest population is in the western Atlantic. Using an age-based demographic model, Spotila *et al.* determined that leatherback populations in the Indian Ocean and western Pacific Ocean cannot withstand even moderate levels of adult mortality and that even the Atlantic populations are being exploited at a rate that cannot be sustained. They concluded that leatherbacks are on the road to extinction and further population declines can be expected unless we take action to reduce adult mortality and increase survival of eggs and hatchlings.

The crash of the Pacific leatherback population is believed primarily to be the result of exploitation by humans for the eggs and meat, as well as incidental take in numerous commercial fisheries of the Pacific. Other factors threatening leatherbacks globally include loss or degradation of nesting habitat from coastal development; disorientation of hatchlings by beachfront lighting; excessive nest predation by native and non-native predators; degradation of foraging habitat; marine pollution and debris; and watercraft strikes.

Hawksbill Sea Turtle

The hawksbill sea turtle has experienced global population declines of 80 percent or more during the past century and continued declines are projected (Meylan and Donnelly 1999). Most populations are declining, depleted, or remnants of larger aggregations. Hawksbills were previously abundant, as evidenced by high-density nesting at a few remaining sites and by trade statistics. The decline of this species is primarily due to human exploitation for tortoiseshell. While the legal hawksbill shell trade ended when Japan agreed to stop importing shell in 1993, a significant illegal trade continues. It is believed that individual hawksbill populations around the world will continue to disappear under the current regime of exploitation for eggs, meat, and tortoiseshell, loss of nesting and foraging habitat, incidental capture in fishing gear, ingestion of and entanglement in marine debris, oil pollution, and boat collisions. Hawksbills are closely associated with coral reefs, one of the most endangered of all marine ecosystem types.

Analysis of the species/critical habitat likely to be affected

The proposed action has the potential to adversely affect nesting females, nests, and hatchlings within the proposed project area. Potential effects include: (1) destruction of nests deposited within the boundaries of the proposed project; (2) disturbance or interference with female turtles attempting to nest within the construction area or on adjacent beaches; (3) lighting disorientation of hatchlings on beaches adjacent to the construction area as they emerge from the nest and crawl to water; (4) behavior modification of nesting females due to escarpment formation within the project area, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (5) behavior modification due to sand quality affecting the ability of female turtles to nest, including the suitability of the nest incubation environment, and the ability of hatchlings to emerge from the nest.

Critical habitat has not been designated in the continental United States; therefore, the proposed action would not result in an adverse modification.

ENVIRONMENTAL BASELINE

Status of the species within the action area

The distribution of sea turtle nesting activity on Florida's southeast Atlantic coast is concentrated between Brevard and Palm Beach counties, the epicenter of sea turtle nesting (Addison *et al.* 2000). Miami-Dade County supports a small percentage (0.6 percent) of Florida's total sea turtle nesting (Meylan *et al.* 1995). Four species are known to nest in Miami-Dade County. The loggerhead sea turtle constitutes by far the largest percentage (approximately 95 percent) of Miami-Dade County's total nesting activity, with an average of 427 loggerhead nests constructed each year (FWC 2002b). Small numbers of green and leatherback turtles nests are also documented, as is one hawksbill turtle nest.

During the 2001 nesting season, 37.8 miles of Miami-Dade County shoreline were surveyed for turtle activity (FWC 2002a). The FWC's 2001 Statewide Sea Turtle Nesting Survey Data, below in Table 1, show a total of 1,076 sea turtle emergences, 505 nests and 571 false crawls (FWC 2002b).

Table 1: Miami-Dade County Sea Turtle Nesting 1988-2001 (FWC Statewide Sea Turtle Nesting Survey Data, FWC 2002b).

Year	Survey Length (km)	<i>C. caretta</i> Nest	<i>C. caretta</i> False Crawl	<i>C. mydas</i> Nest	<i>C. mydas</i> False Crawl	<i>D. coriacea</i> Nest	<i>D. coriacea</i> False Crawl
2001	37.8	496	564	0	0	9	7
2000	37.8	516	775	5	7	2	5
1999	37.8	516	565	64	78	9	5
1998	38.1	545	937	4	10	2	1
1997	38.1	415	599	0	2	3	3
1996	37.6	448	517	12	13	0	0
1995	37.4	470	595	2	0	2	2
1994	34.7	445	454	1	1	1	0
1993	38.9	392	401	1	0	6	3
1992	38.6	367	416	4	5	0	0
1991	30.7	439	510	2	2	0	0

1990	31.5	390	486	3	2	0	0
1989	29.9	325	407	2	6	0	0
1988	29.9	219	196	6	2	5	0

Nesting Data for Haulover Beach

The entire length of the Haulover Beach Park shoreline is surveyed daily from March through November for sea turtle nesting activity (B. Ahern, personal communication, 2002b). Although loggerhead, green, leatherback and hawksbill sea turtles are all known to nest in Miami-Dade County, almost all nesting activity on Haulover Beach Park has been by loggerhead sea turtles, small numbers of green and leatherback sea turtle nesting as well (B. Ahern 2002a, J. Hibler 2002).

Table 2: Haulover Beach Park Turtle Nesting Data 1989-2001 (B. Ahern 2002a, J. Hibler 2002).

Year	<i>C. caretta</i> Nest	<i>C. caretta</i> False Crawl	<i>C. mydas</i> Nest	<i>C. mydas</i> False Crawl	<i>D. coriacea</i> Nest	<i>D. coriacea</i> False Crawl
2001	31	18	0	0	1	0
2000	19	9	2	0	0	0
1999	52	32	0	0	0	0
1998	28	23	0	0	0	0
1997	29	31	0	0	0	0
1996	17	12	1	0	0	0
1995	34	16	0	0	0	0
1994	20	8	0	0	0	0
1993	21	15	0	0	0	0
1992	21	19	1	0	0	0
1991	22	15	0	0	0	0
1990	26	14	0	0	1	0
1989	20	18	0	0	0	0
1988	Unavailable	Unavailable	0	1	1	0
1987	Unavailable	Unavailable	1	0	0	0
1986	Unavailable	Unavailable	0	0	0	0

1985	Unavailable	Unavailable	0	0	0	0
1984	Unavailable	Unavailable	0	0	0	0

Loggerhead Sea Turtle

The loggerhead sea turtle nesting and hatching season for southern Florida Atlantic beaches, from Brevard to Dade County, extends from March 15 through November 30. Incubation ranges from about 45 to 95 days. Loggerhead turtle nesting data on Haulover Beach shows that 340 turtles have nested in the Park since 1988 (B. Ahern 2002a, J. Hibler 2002).

Green Sea Turtle

The green sea turtle nesting and hatching season for southern Florida atlantic beaches, from Brevard to Dade County, extends from May 1 through November 30. Incubation ranges from about 45 to 75 days. No green turtle nesting has occurred on Haulover Beach in the recent past (B. Ahern, personal communication, 2002b). Green turtle nesting data on Haulover Beach Park shows that six green turtles have nested in the Park since 1984 (J. Hibler 2002).

Leatherback Sea Turtle

The leatherback sea turtle nesting and hatching season for southern Florida atlantic beaches, from Brevard to Dade County extends from February 15 through November 15. Incubation ranges from about 55 to 75 days. Fourteen leatherback sea turtles are documented as nesting in Miami-Dade County from 1993 to 2000 (FWC 2001), with one recently nesting on Haulover Beach (W. Teas, personal communication, 2002; B. Ahern, personal communication, 2002b). Leatherback nesting data on Haulover Beach Park shows that six have nested in the Park since 1984 (J. Hibler 2002).

Hawksbill Sea Turtle

The hawksbill sea turtle nesting and hatching season for southern Florida Atlantic beaches, from Brevard to Dade County extends from June 1 through December 31. Incubation lasts about 60 days. Hawksbill sea turtles sporadically nest in Florida with only 13 nests identified between the 1993 and the 2000 nesting seasons (FWC 2001). A single hawksbill sea turtle was documented nesting in Miami-Dade County, in 1995 on Virginia Key, 10.9 miles south of Haulover Beach Park (W. Teas, personal communication, 2002, B. Ahern, personal communication, 2002b).

Factors affecting the species environment within the action area

Haulover Beach Park is located on the southern portion of the northern Miami Beach barrier island and is separated from Bal Harbour to the south by Baker's Haulover Inlet, which was constructed in 1922. The City of Sunny Isles is immediately adjacent to the north end of the park. The Park comprises the lower 1.5 mile long portion of the island peninsula, and ranges from

approximately 660 to 1,320 feet in width. Sections of the Park's beaches have been renourished in 1980, 1984, 1987, and 1994. The proposed sand placement and berm construction project will extend along approximately 2,600 feet of the 1.5 mile long beach, from DEP monument R-19 to R-22, extending along about a third of northern portion of the Park.

The Dade County Board established Haulover Beach Park in 1935, recognizing the need for more public beaches. The first master plan was prepared between 1938 and 1944. It included the State's planned realignment of Route A1A with the currently existing pedestrian underpasses. Some original structures, built between 1946 and 1947, remain, such as the shower room, the Life Guard Headquarters, and the refreshment pavilion. The marina areas, including the dockmaster's office, fueling dock, bait shop, restaurant, and park office building, were completed between 1947 and 1952, as was construction of the bulkheads, marina dredging, dock, finger piers, and jetties. In 1952, a fishing pier was constructed just north of the Haulover Cut, which the 1992 Hurricane Andrew damaged. The pier was removed in 1995. Other Park improvements, built in the 1960s and 1970s, included upgrading the picnic area, additions of restrooms, parking lots, boat basin and channel dredging, boat ramp and parking development, a 9-hole golf course, and a fire station. In 1988 the north parking lot was constructed to increase public beach access and accommodate trailer camping. The 1990 improvements to the beach dune area included revegetation and construction of pedestrian crossovers.

EFFECTS OF THE ACTION

Analyses for effects of the action

Beneficial Effects

The placement of sand on a beach with reduced dry fore-dune habitat may increase sea turtle nesting habitat if the sand is highly compatible (i.e., grain size, shape, color, etc.) with naturally occurring beach sediments in the area and compaction and escarpment remediation measures are incorporated into the project design. In addition, a nourished beach that is designed and constructed to mimic a natural beach system may be more stable than the eroding one it replaces, thereby benefitting sea turtles.

Direct Effects

Although beach nourishment may increase potential nesting area, significant impacts to sea turtles may result if protective measures are not incorporated during project construction. Nourishment and groin construction during the nesting season, particularly on or near high density nesting beaches, can cause increased loss of eggs and hatchlings, and may significantly impact the long-term survival of the species. While a nest monitoring and egg relocation program or a nest mark and avoidance program would reduce these impacts, nests may be inadvertently missed (when crawls are obscured by rainfall, wind, and/or tides) or misidentified as false crawls during daily patrols. In addition, nests may be destroyed by operations at night

prior to beach patrols being performed. Even under the best conditions, about 7 percent of the nests can be misidentified as false crawls by experienced sea turtle nest surveyors (Schroeder 1994).

1. Nest relocation

Project construction, including sand placement, is likely to occur during the sea turtle nesting season, therefore, sea turtle nest relocation is a possibility during the estimated two to three month project construction window. Besides the potential for missing nests during a nest relocation program, there is a potential for eggs to be damaged by their movement, particularly if eggs are not relocated within 12 hours of deposition (Limpus *et al.* 1979). Nest relocation can have adverse impacts on incubation temperature (and hence sex ratios), gas exchange parameters, hydric environment of nests, hatching success, and hatchling emergence (Limpus *et al.* 1979, Ackerman 1980, Parmenter 1980, Spotila *et al.* 1983, McGehee 1990). Relocating nests into sands deficient in oxygen or moisture can result in mortality, morbidity, and reduced behavioral competence of hatchlings. Water availability is known to influence the incubation environment of the embryos and hatchlings of turtles with flexible-shelled eggs, which has been shown to affect nitrogen excretion (Packard *et al.* 1984), mobilization of calcium (Packard and Packard 1986), mobilization of yolk nutrients (Packard *et al.* 1985), hatchling size (Packard *et al.* 1981, McGehee 1990), energy reserves in the yolk at hatching (Packard *et al.* 1988), and locomotory ability of hatchlings (Miller *et al.* 1987).

Comparisons of hatching success between relocated and *in situ* nests have noted significant variation ranging from a 21 percent decrease to a 9 percent increase for relocated nests (Florida Department of Environmental Protection, unpublished data). Comparisons of emergence success between relocated and *in situ* nests have also noted significant variation ranging from a 23 percent decrease to a 5 percent increase for relocated nests (DEP, unpublished data). A 1994 Florida Department of Environmental Protection study of hatching and emergence success of *in situ* and relocated nests at seven sites in Florida found that hatching success was lower for relocated nests in five of seven cases with an average decrease for all seven sites of 5.01 percent (range = 7.19 percent increase to 16.31 percent decrease). Emergence success was lower for relocated nests in all seven cases by an average of 11.67 percent (range = 3.60 to 23.36 percent) (Meylan 1995).

2. Equipment

The placement of pipelines, construction materials, and the use of heavy machinery or equipment on the beach during a construction project may also have adverse effects on sea turtles. They can create barriers to nesting females emerging from the surf and crawling up the beach, causing a higher incidence of false crawls and unnecessary energy expenditure. The equipment can also create impediments to hatchling sea turtles as they crawl to the ocean.

3. Artificial lighting

Visual cues are the primary sea-finding mechanism for hatchling sea turtles (Mrosovsky and Carr 1967, Mrosovsky and Shettleworth 1968, Dickerson and Nelson 1989, Witherington and

Bjorndal 1991). When artificial lighting is present on or near the beach, it can misdirect hatchlings once they emerge from their nests and prevent them from reaching the ocean (Philbosian 1976; Mann 1977; DEP, unpublished data). In addition, a significant reduction in sea turtle nesting activity has been documented on beaches illuminated with artificial lights (Witherington 1992). Therefore, construction lights along a project beach and on the dredging vessel may deter females from coming ashore to nest, misdirect females trying to return to the surf after a nesting event, and misdirect emergent hatchlings from adjacent non-project beaches. Any source of bright lighting can profoundly affect the orientation of hatchlings, both during the crawl from the beach to the ocean and once they begin swimming offshore. Hatchlings attracted to light sources on dredging barges may not only suffer from interference in migration, but may also experience higher probabilities of predation to predatory fishes that are also attracted to the barge lights. This impact could be reduced by using the minimum amount of light necessary (may require shielding) or low pressure sodium lighting during project construction.

4. Entrapment/physical obstruction

Adult females approaching the nesting beach may encounter the dredge pipeline or any construction equipment or structures and either go around them, abort nesting activities for that night, or move to another section of beach to nest. The pipeline may act as a barrier and also prevent nesting.

Indirect Effects

Many of the direct effects of beach nourishment may persist over time and become indirect impacts. These indirect effects include increased susceptibility of relocated nests to catastrophic events, the consequences of potential increased beachfront development, changes in the physical characteristics of the beach, the formation of escarpments, and future sand migration.

1. Increased susceptibility to catastrophic events

Nest relocation may concentrate eggs in an area making them more susceptible to catastrophic events. Hatchlings released from concentrated areas also may be subject to greater predation rates from both land and marine predators, because the predators learn where to concentrate their efforts (Glenn 1998, Wyneken *et al.* 1998).

2. Increased beachfront development

Pilkey and Dixon (1996) state that beach replenishment frequently leads to more development in greater density within shorefront communities that are then left with a future of further replenishment or more drastic stabilization measures. Since the Park is not expected to be developed residentially or commercially, effects of renourishment may be felt in adjacent communities. Dean (1999) also notes that the very existence of a beach nourishment project can encourage more development in coastal areas. Following completion of a beach nourishment project in Miami during 1982, investment in new and updated facilities substantially increased tourism there (National Research Council 1995). Increased building density immediately adjacent to the beach often resulted as older buildings were replaced by much larger ones that

accommodated more beach users. Overall, shoreline management creates an upward spiral of initial protective measures resulting in more expensive development which leads to the need for more and larger protective measures. Increased shoreline development may not occur in the Park but may occur just outside in adjacent communities and may adversely affect sea turtle nesting success. Greater development may support larger populations of mammalian predators, such as foxes and raccoons, than undeveloped areas (National Research Council 1990a), and can also result in greater adverse effects due to artificial lighting, as discussed above.

3. Changes in the physical environment

Beach nourishment may result in changes in sand density or compaction, beach shear resistance or hardness, beach moisture content, beach slope, sand color, sand grain size, sand grain shape, and sand grain mineral content if the placed sand is dissimilar from the original beach sand (Nelson and Dickerson 1988a). These changes could result in adverse impacts on nest site selection, digging behavior, clutch viability, and emergence by hatchlings (Nelson and Dickerson 1987, Nelson 1988).

Beach compaction and unnatural beach profiles that may result from beach nourishment activities could negatively impact sea turtles regardless of the timing of projects. Very fine sand and the use of heavy machinery can cause sand compaction on nourished beaches (Nelson *et al.* 1987, Nelson and Dickerson 1988a). Significant reductions in nesting success (i.e., false crawls occurred more frequently) have been documented on severely compacted nourished beaches (Fletemeyer 1980, Raymond 1984, Nelson and Dickerson 1987, Nelson *et al.* 1987), and increased false crawls may result in increased physiological stress to nesting females. Sand compaction may increase the length of time required for female sea turtles to excavate nests and also cause increased physiological stress to the animals (Nelson and Dickerson 1988c). Nelson and Dickerson (1988b) concluded that, in general, beaches nourished from offshore borrow sites are harder than natural beaches, and while some may soften over time through erosion and accretion of sand, others may remain hard for 10 years or more.

These impacts can be minimized by using suitable sand and by tilling compacted sand after project completion. The level of compaction of a beach can be assessed by measuring sand compaction using a cone penetrometer (Nelson 1987). Tilling of a nourished beach with a root rake may reduce the sand compaction to levels comparable to unnourished beaches. However, a pilot study by Nelson and Dickerson (1988c) showed that a tilled nourished beach will remain uncompacted for up to 1 year. Therefore, the Service requires multi-year beach compaction monitoring and, if necessary, tilling to ensure that project impacts on sea turtles are minimized.

A change in sediment color on a beach could change the natural incubation temperatures of nests in an area, which, in turn, could alter natural sex ratios. To provide the most suitable sediment for nesting sea turtles, the color of the nourished sediments must resemble the natural beach sand in the area. Natural reworking of sediments and bleaching from exposure to the sun would help to lighten dark nourishment sediments; however, the time frame for sediment mixing and bleaching to occur could be critical to a successful sea turtle nesting season.

4. Escarpment formation

On nourished beaches, steep escarpments may develop along their water line interface as they adjust from an unnatural construction profile to a more natural beach profile (Coastal Engineering Research Center 1984, Nelson *et al.* 1987). These escarpments can hamper or prevent access to nesting sites (Nelson and Blihovde 1998). Researchers have shown that female turtles coming ashore to nest can be discouraged by the formation of an escarpment, leading to situations where they choose marginal or unsuitable nesting areas to deposit eggs (e.g., in front of the escarpments, which often results in failure of nests due to prolonged tidal inundation). This impact can be minimized by leveling any escarpments prior to the nesting season.

Species' response to the proposed action

Ernest and Martin (1999) conducted a comprehensive study to assess the effects of beach nourishment on loggerhead sea turtle nesting and reproductive success. The following findings illustrate sea turtle responses to and recovery from a nourishment project. A significantly larger proportion of turtles emerging on nourished beaches abandoned their nesting attempts than turtles emerging on Control or pre-nourished beaches. This reduction in nesting success was most pronounced during the first year following project construction and is most likely the result of changes in physical beach characteristics associated with the nourishment project (e.g., beach profile, sediment grain size, beach compaction, frequency and extent of escarpments). During the first post-construction year, the time required for turtles to excavate an egg chamber on the untilled, hard-packed sands of one treatment area increased significantly relative to Control and background conditions. However, in another treatment area, tilling was effective in reducing sediment compaction to levels that did not significantly prolong digging times. As natural processes reduced compaction levels on nourished beaches during the second post-construction year, digging times returned to background levels.

During the first post-construction year, nests on the nourished beaches were deposited significantly farther from both the toe of the dune and the tide line than nests on control beaches. Furthermore, nests were distributed throughout all available habitat and were not clustered near the dune as they were in the control. As the width of nourished beaches decreased during the second year, among-treatment differences in nest placement diminished. More nests were washed out on the wide, flat beaches of the nourished treatments than on the narrower steeply sloped beaches of the control. This phenomenon persisted through the second post-construction year monitoring and resulted from the placement of nests near the seaward edge of the beach berm where dramatic profile changes, caused by erosion and scarping, occurred as the beach equilibrated to a more natural contour.

As with other beach nourishment projects, Ernest and Martin (1999) found that the principal effect of nourishment on sea turtle reproduction was a reduction in nesting success during the first year following project construction. Although most studies have attributed this phenomenon to an increase in beach compaction and escarpment formation, Ernest and Martin indicate that changes in beach profile may be more important. Regardless, as a nourished beach is reworked

by natural processes in subsequent years and adjusts from an unnatural construction profile to a more natural beach profile, beach compaction and the frequency of escarpment formation decline, and nesting and nesting success return to levels found on natural beaches. According to the results of the Ernest and Martin study, nesting success was shown to decrease the first year following sand placement and then subsequently returned to levels found on natural beaches. However, the long-term effect of a short renourishment interval on sea turtle nesting is unknown.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this Biological Opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. The Service is not aware of any cumulative effects in the project area.

CONCLUSION

After reviewing the current status of the loggerhead, leatherback, and green sea turtles, the environmental baseline for the action area, the effects of the proposed sand placement, and the cumulative effects, it is the Service's Biological Opinion that the construction project, as proposed, is not likely to jeopardize the continued existence of the loggerhead, leatherback, and green sea turtles and is not likely to destroy or adversely modify designated critical habitat. No critical habitat has been designated for the loggerhead, leatherback, and green sea turtles in the continental United States; therefore, none will be affected.

The proposed project will affect only 2,600 feet of the approximately 1,400 miles of available sea turtle nesting habitat in the southeastern United States. Research has shown that the principal effect of beach nourishment on sea turtle reproduction is a reduction in nesting success, and this reduction is most often limited to the first year following project construction. Research has also shown that the impacts of a nourishment project on sea turtle nesting habitat are typically short-term because a nourished beach will be reworked by natural processes in subsequent years, and beach compaction and the frequency of escarpment formation will decline. Although a variety of factors, including some that cannot be controlled, can influence how a beach renourishment and berm construction project will perform from an engineering perspective, measures can be implemented to minimize impacts to sea turtles.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly

impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

The Service anticipates 2,600 feet of nesting beach habitat could be taken as a result of this proposed action. The take is expected to be in the form of: (1) destruction of all nests that may be constructed and eggs that may be deposited and missed by a nest survey and marking program within the boundaries of the proposed project; (2) destruction of all nests deposited during the period when a nest survey and marking program is not required to be in place within the boundaries of the proposed project; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site; (4) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (5) behavior modification of nesting females or hatchlings due to the presence of equipment, which may act as barriers to movement; (6) misdirection of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (7) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (8) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Service.

Incidental take is anticipated for only the 2,600 feet of beach that has been identified for renourishment. The Service anticipates incidental take of sea turtles will be difficult to detect for the following reasons: (1) the turtles nest primarily at night and all nests are not found because [a] natural factors, such as rainfall, wind, and tides may obscure crawls and [b] human-caused

factors, such as pedestrian and vehicular traffic, may obscure crawls, and result in nests being destroyed because they were missed during a nesting survey and egg relocation program; (2) the total number of hatchlings per undiscovered nest is unknown; (3) the reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown; (4) an unknown number of females may avoid the project beach and be forced to nest in a less than optimal area; (5) lights may misdirect an unknown number of hatchlings and cause death; and (6) escarpments may form and cause an unknown number of females from accessing a suitable nesting site. However, the level of take of these species can be anticipated by the disturbance of renourishment on suitable turtle nesting beach habitat because: (1) turtles nest within the project site; (2) beach renourishment will likely occur during a portion of the nesting season; (3) the renourishment project will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting will deter and/or misdirect nesting females and hatchlings.

EFFECT OF THE TAKE

In the accompanying Biological Opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species. Critical habitat has not been designated in the project area; therefore, the project will not result in destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of loggerhead, green, leatherback, and Hawksbill sea turtles.

1. Beach quality sand suitable for sea turtle nesting, successful incubation, and hatchling emergence must be used on the project site.
2. If the beach nourishment project is to be conducted during the sea turtle nesting season, surveys for nesting sea turtles must be conducted. If nests are constructed in the area of beach nourishment, the eggs must be relocated.
3. Immediately after completion of the beach nourishment project and prior to the next three nesting seasons, beach compaction must be monitored and tilling must be conducted as required to reduce the likelihood of impacting sea turtle nesting and hatching activities.
4. Immediately after completion of the beach nourishment project and prior to the next three nesting seasons, monitoring must be conducted to determine if escarpments are present and escarpments must be leveled as required to reduce the likelihood of impacting sea turtle nesting and hatching activities.
5. The project sponsor must ensure that contractors conducting the beach renourishment and associated activities fully understand the sea turtle protection measures detailed in this incidental take statement.

6. During the sea turtle nesting season, all construction equipment and materials must be stored in a manner that will minimize impacts to sea turtles to the maximum extent practicable.

7. During the sea turtle nesting season, lighting associated with the project must be minimized to reduce the possibility of disrupting and misdirecting nesting and hatchling sea turtles.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. All fill material placed on the beach must be analogous to that which naturally occurs within the project location or vicinity in quartz to carbonate ratio, color, median grain size and median sorting. Specifically, such material shall be predominately of carbonate, quartz or similar material with a particle size distribution ranging between 0.62 mm and 4.76 mm (classified as sand by either the Unified Soil Classification System or the Wentworth classification). The material shall be similar in color and grain size distribution (sand grain frequency, mean and median grain size, and sorting coefficient) to the material in the existing coastal system at the disposal site and shall not contain:

- greater than five percent, by weight, silt, clay, or colloids passing the #230 sieve;
- greater than five percent, by weight, fine gravel retained on the #4 sieve;
- coarse gravel, cobbles, or material retained on the 3/4 inch sieve in a percentage or size greater than found on the native beach;
- construction debris, toxic material, or other foreign matter; and
- not result in cementation of the beach.

These standards must not be exceeded in any 1000 square foot section, extending through the depth of the renourished beach. If the natural beach exceeds any of the limiting parameters listed above, then the fill material must not exceed the naturally occurring level for that parameter.

2. Daily early morning surveys for sea turtle nests will be required if any portion of the beach nourishment project and berm construction project occurs during the period from April 1 through November 30. Nesting surveys must be initiated 65 days prior to nourishment or construction activities or by April 1, whichever is later. Nesting surveys must continue through the end of the project or through September 30, whichever is earlier. If nests are constructed in areas where they may be affected by beach nourishment activities, eggs must be relocated per the following requirements.

2a. Nesting surveys and egg relocations will only be conducted by personnel with prior experience and training in nesting survey and egg relocation procedures. Surveyors must have a valid Florida Fish and Wildlife Conservation Commission permit. Nesting surveys

must be conducted daily between sunrise and 9 a.m. Surveys must be performed in such a manner so as to ensure that beach nourishment activity does not occur in any location prior to completion of the necessary sea turtle protection measures.

2b. Only those nests that may be affected by construction activities will be relocated. Nests requiring relocation must be moved no later than 9 a.m. the morning following deposition to a nearby self-release beach site in a secure setting where artificial lighting will not interfere with hatchling orientation. Nest relocations in association with construction activities must cease when construction activities no longer threaten nests. Nests deposited within areas where construction activities have ceased or will not occur for 65 days must be marked and left in place unless other factors threaten the success of the nest. Any nests left in the active construction zone must be clearly marked, and all mechanical equipment must avoid nests by at least 10 feet.

3. Immediately after completion of the beach nourishment project and prior to April 1 for three subsequent years, sand compaction must be monitored in the area of restoration in accordance with a protocol agreed to by the Service, the State regulatory agency, and the applicant. At a minimum, the protocol provided under 3a and 3b below must be followed. If required, the area must be tilled to a depth of 36 inches. All tilling activity must be completed prior to April 1. If the project is completed during the nesting season, tilling will not be performed in areas where nests have been left in place or relocated. An annual summary of compaction surveys and the actions taken must be submitted to the Service. (NOTE: The requirement for compaction monitoring can be eliminated if the decision is made to till regardless of post-construction compaction levels. Also, out-year compaction monitoring and remediation are not required if placed material no longer remains on the dry beach.)

3a. Compaction sampling stations must be located at 500-foot intervals along the project area. One station must be at the seaward edge of the dune/bulkhead line (when material is placed in this area), and one station must be midway between the dune line and the high water line (normal wrack line).

At each station, the cone penetrometer will be pushed to a depth of 6, 12, and 18 inches three times (three replicates). Material may be removed from the hole if necessary to ensure accurate readings of successive levels of sediment. The penetrometer may need to be reset between pushes, especially if sediment layering exists. Layers of highly compact material may lay over less compact layers. Replicates will be located as close to each other as possible, without interacting with the previous hole and disturbed sediments. The three replicate compaction values for each depth will be averaged to produce final values for each depth at each station. Reports will include all 18 values for each transect line, and the final 6 averaged compaction values.

3b. If the average value for any depth exceeds 500 pounds per-square inch (psi) for any two or more adjacent stations, then that area must be tilled immediately prior to April 1. If values exceeding 500 psi are distributed throughout the project area but in no case do those values

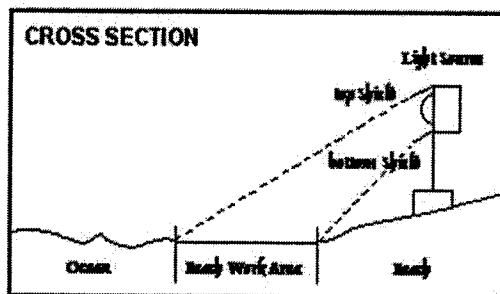
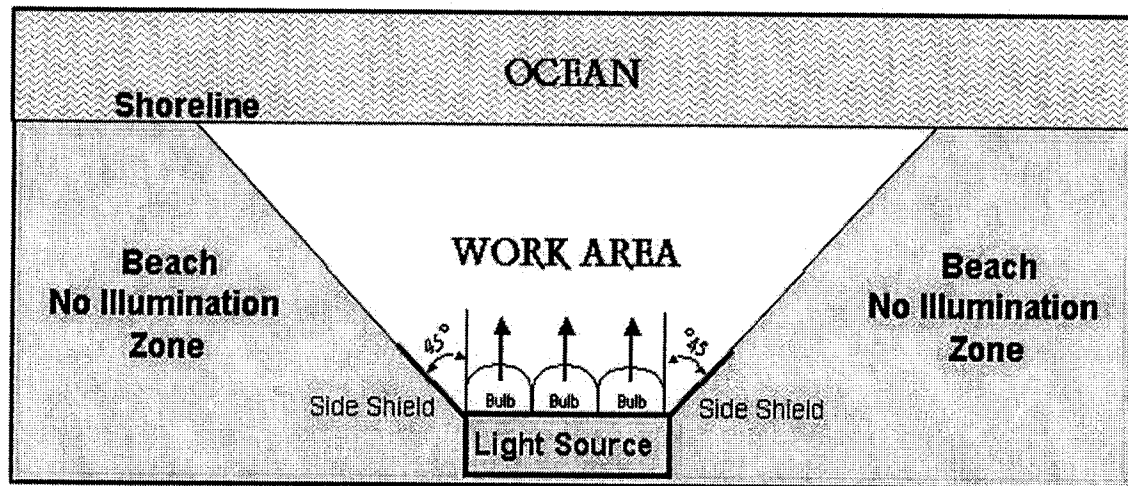
exist at two adjacent stations at the same depth, then consultation with the Service will be required to determine if tilling is required. If a few values exceeding 500 psi are present randomly within the project area, tilling will not be required.

4. Visual surveys for escarpments along the project area must be made immediately after completion of the beach nourishment project and prior to April 1 for three subsequent years. Escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet must be leveled to the natural beach contour by April 1. If the project is completed during the sea turtle nesting and hatching season, escarpments may be required to be leveled immediately, while protecting nests that have been relocated or left in place. The Service must be contacted immediately if subsequent reformation of escarpments that interfere with sea turtle nesting or that exceed 18 inches in height for a distance of 100 feet occurs during the nesting and hatching season to determine the appropriate action to be taken. If it is determined that escarpment leveling is required during the nesting or hatching season, the Service will provide a brief written authorization that describes methods to be used to reduce the likelihood of impacting existing nests. An annual summary of escarpment surveys and actions taken must be submitted to the Service. (NOTE: Out-year escarpment monitoring and remediation are not required if placed material no longer remains on the beach.)

5. The applicant must arrange a meeting between representatives of the contractor, the Service, the FWC, and the permitted person responsible for nest marking and egg relocation at least 30 days prior to the commencement of work on this project. At least 10 days advance notice must be provided prior to conducting this meeting. This will provide an opportunity for explanation and clarification of the sea turtle protection measures.

6. From April 1 through November 30, staging areas for construction equipment must be located off the beach to the maximum extent practicable. Nighttime storage of construction equipment and berm construction materials not in use must be off the beach to minimize disturbance to sea turtle nesting and hatching activities. In addition, all construction pipes and other construction materials that are placed on the beach must be located as far landward as possible without compromising the integrity of the existing or reconstructed dune system. Temporary storage of pipes and berm construction materials must be off the beach to the maximum extent possible. Temporary storage of pipes on the beach must be in such a manner so as to impact the least amount of nesting habitat and must likewise not compromise the integrity of the dune systems (placement of pipes perpendicular to the shoreline is recommended as the method of storage).

7. During sand placement, from April 1 through November 30, direct lighting of the beach and near shore waters must be limited to the immediate construction area and must comply with safety requirements. Lighting on offshore or onshore equipment must be minimized through reduction, shielding, lowering, and appropriate placement to avoid excessive illumination of the waters surface and nesting beach while meeting all Coast Guard, EM 385-1-1, and OSHA requirements. Light intensity of lighting plants must be reduced to the minimum standard required by OSHA for General Construction areas, in order not to mis-direct sea turtles. Shields must be affixed to the light housing and be large enough to block light from all lamps from being



**BEACH LIGHTING
SCHEMATIC**

transmitted outside the construction area (see figure below).

8. No permanent exterior lighting will be installed in association with this construction project.
9. A report describing the actions taken to implement the terms and conditions of this incidental take statement must be submitted to the South Florida Ecological Services Office within 60 days of completion of the proposed work for each year when the activity has occurred. This report will include the dates of actual construction activities; names and qualifications of personnel involved in nest surveys, marking, and relocation activities; descriptions and locations of self-release beach sites; nest survey, marking, and relocation results; and hatching and emerging success of nests.
10. In the event a sea turtle nest is excavated during construction activities, the permitted person responsible for nest marking and egg relocation for the project must be notified so the eggs can be moved to a suitable relocation site.

11. Upon locating a sea turtle adult, hatchling, or egg harmed or destroyed as a direct or indirect result of the project, notification must be made to the FWC, Bureau of Marine Enforcement (formerly the Florida Marine Patrol) at 800-342-5367. Care should be taken in handling injured turtles or eggs to ensure effective treatment or disposition, and in handling dead specimens to preserve biological materials in the best possible state for later analysis.

The Service believes that incidental take will be limited to the 2,600 feet of beach that have been identified as the project area which includes sand placement and berm construction. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The Service believes that no more than the following types of incidental take will result from the proposed action: (1) destruction of all nests that may be constructed and eggs that may be deposited and missed by a nest survey and marking program within the boundaries of the proposed project; (2) destruction of all nests deposited during the period when a nest survey and marking program is not required to be in place within the boundaries of the proposed project; (3) reduced hatching success due to egg mortality during relocation and adverse conditions at the location site; (4) harassment in the form of disturbing or interfering with female turtles attempting to nest within the project construction area or on adjacent beaches as a result of construction activities; (5) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (6) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; and (7) destruction of nests from escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service. The amount or extent of incidental take for sea turtles will be considered exceeded if the project results in more the placement of sand at more than a five year interval on the 2,600 feet of beach proposed for beach renourishment. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Corps must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. Construction activities for this project and similar future projects should be planned to take place outside the sea turtle nesting and hatching season.

2. Appropriate native salt-resistant dune vegetation should be established on restored dunes. The Florida Department of Environmental Protection's (DEP) Office of Beaches and Coastal Systems can provide technical assistance on the specifications for design and implementation.
3. Surveys for nesting success of sea turtles should be continued for a minimum of three years following project construction to determine whether sea turtle nesting success has been adversely impacted.
4. Educational signs should be placed where appropriate at beach access points explaining the importance of the area to sea turtles and the life history of sea turtle species that nest in the area.
5. The silt size fraction of the sediments in the ebb shoal exceed Florida's 5 percent standard (percent by weight passing the 230 sieve; §62B-41.007(2)(j)) within four cores. Core 57 contains 6.00 percent silt at 4.5 feet; core 58 contains 5.19-9.34 percent silt at 3-11 feet depth; core 59 contains 11.32 percent silt at 9 feet; and core 61 contains 12.30 percent silt at 9.3 feet depth. The Service recommends that these areas be avoided, and be verified that the Corps' provision to not remove sediments within 2 feet of unsuitable material is met at the locations of these cores (Corps 1997). Avoidance of these sedimentary layers would also avoid the gravelly layer in core 59.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.


REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the request. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

Should you have additional questions or require additional clarification regarding this matter, please contact Andrew Gude at (305) 872-5563.

Sincerely yours,



 James J. Slack
Field Supervisor
South Florida Ecological Services Office

cc:

Service, Jacksonville, Florida (Sandy MacPherson)
FWC, Tallahassee, Florida (Robbin Trindell)
NMFS, Miami, Florida (Mike Johnson)
NMFS, Protected Resources Division, St. Petersburg, Florida
EPA, West Palm Beach

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DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAY 10 2002

Mr. Heinz J. Mueller, Chief
Office of Environmental Assessment
U.S. Environmental Protection Agency
61 Forsyth Street
Atlanta, Georgia 30303-8960

Dear Mr. Mueller:

This references the Dade County Beach Erosion Control and Hurricane Protection Project and your letter dated March 26, 2002, providing comments on the Draft Environmental Assessment for the proposed renourishment at Haulover Beach Park.

Our responses to those comments are provided in the enclosure to this letter. If you have any questions, please contact Mr. Mike Dupes at 904-232-1689 or email at michael.dupes@saj02.usace.army.mil.

Sincerely,

George M. Strain
Acting Chief, Planning Division

Enclosure

Copy Furnished:

Mr. Richard Harvey, U.S. Environmental Protection Agency, South Florida Office,
400 North Congress Avenue, Suite 120, West Palm Beach, Florida 33401

**Responses to EPA's comments on the
Draft Environmental Assessment for the Proposed
Renourishment at Haulover Beach Park**

Comment 1. Page 1, Description of Proposed Action 1.4. From a cost perspective use of the ebb shoal at Bakes Haulover Inlet as a sand source is appealing given its proximity. However, the borrow area is only in 10-20' of water; hence we are concerned about how the removal of 114,100 cubic yards of material from just offshore will affect adjacent transport processes. We understand that some shoal will remain to provide wave refraction, but this action could well be a short-term "fix" which results in a long-term problem.

Response: According to the "Dade County Regional Sediment Budget" (CSI, Inc, 1997) an average of 60,000 cubic yards per year (cy/yr) is transported southward along the Haulover Beach shoreline and is delivered to the vicinity of Bakers Haulover Inlet. Due to the existing obstructions to littoral transport created by the two jetties and navigation channel at Bakers Haulover Inlet, only 19,000 cy/yr bypasses the inlet to the south. The strong tidal currents, which run through Bakers Haulover Inlet, divert a large percentage of sediment transported into the inlet to the ebb and flood shoals. An estimated 9,000 cy/yr is transported into the interior channels of the inlet by the flood tidal currents, and during periodic maintenance dredging of these channels this material is usually placed on the Bal Harbor shoreline to the south of the inlet, supplementing the small volume of naturally bypassed material. Approximately 32,000 cy/yr is transported by ebb tidal currents offshore into the ebb shoal system.

Evidence suggests that the majority of sediment transported southward along the coast moves within the surf zone, well landward of the ebb shoal. The landward edge of the ebb shoal is separated from the shoreline by a distance of about 1500 feet, and water depths between the shoal and the shoreline approach 20 feet. Since the depth of closure (minimal sediment transport) is generally regarded as being about -18 feet, it is unlikely that a significant portion of the southward-moving sediment along the Dade County shoreline is transported directly into the ebb shoal by littoral processes alone, and sediment within the ebb shoal may be regarded as being outside of the littoral system. Previous studies and analysis of recent bathymetric data suggest that the primary mechanism for sediment transport into the ebb shoal is by the offshore-directed transport of sediment entering the inlet along the shoreline, and then being transported offshore by the strong ebb tidal currents through the inlet.

As stated above, approximately 32,000 cy/yr (53 percent of annual net transport volume) is transported offshore by tidal currents through the inlet and deposited in the ebb shoal, where it is effectively removed from the littoral system. Due to the presence of the channel and associated strong tidal currents south of the ebb shoal, very little material is transported naturally from the ebb shoal southward onto the beaches south of the inlet (Bakers Haulover Inlet Management Plan, CP&E, 1995). Periodic use of the

ebb shoal as a borrow source can re-introduce some of this material into the littoral system, but it is important to allow a large portion of the ebb shoal to remain in place to avoid significant impacts to the wave sheltering and wave refraction properties provided by the shoal.

It is anticipated that the shoal will continue to accrete at an average rate of about 32,000 cy/yr, with or without project construction. The volume excavated for the proposed renourishment will therefore be replaced within 4 years.

Comment 2. Page 8, Alternatives 2.1.1. States no hardgrounds are located within the borrow area, and no hardgrounds occur within 200 feet of the eastern tip of the borrow area. EPA recommends that a 400-foot buffer zone be placed between the borrow area and any nearby hardbottom reefs.

Response: The boundary of the borrow area has been adjusted to provide a 400-foot buffer zone from any hardbottom habitat.

Comment 3. Page 10, Table 1: Summary of Direct and Indirect Impacts for Alternatives Considered. Under proposed EBB Shoal Borrow Area (Row 2, Column 3) there is the statement that no impact(s) to hardground communities are expected, rather it should state the same effects as listed under alternative Borrow Areas South of Government Cut (potential sedimentation, turbid, and mechanical impacts).

Response: Concur, the table has been revised.

Comment 4. Page 18, Beach Renourishment Activities: States minimal impacts to nearshore hardbottom communities are expected by sand placement (i.e. disposal) on the beach due to the distance of the reefs to the shore. In conjunction with the Coast of Florida Erosion and Storm Effects Study, the hardground areas of Dade County were mapped using side scan sonar. In addition, aerial photography flown in July 1997 has also been used to map the nearshore hardground. The closest hardground community in the vicinity of the proposed beach fill at Haulover Beach Park is in excess of 800 feet. EPA requests that the U.S. Army Corps of Engineers conduct a new hardbottom resource survey of the borrow area areas and beach renourishment site. Information provided in the Coast of Florida Study and review of 1997 aerial photography may not accurately portray present site conditions. The Coast of Florida Study was not designed or intended to identify the hardbottom resources along the coast. The EA should also include a map and description of the hardbottom resources located within the project boundaries.

Response: Based on comparisons of the 1997 aerial photography with diver verifications of the shoreward edge of the nearshore reef during the planning of recent past renourishments and the recent construction of the breakwaters at Sunny Isles, the

Corps is satisfied that the 1997 aerial photography does accurately portray the location of the nearshore reef. A map showing the location of the nearshore reef relative to the beach fill area will be included in the final EA.

Comment 5. The EA needs to address the long-term management of the proposed project.

Response: The long term management plan for the project is based upon the approved General Design Memorandum (revised 1/8/76) and FEIS (April 1975), subsequent NEPA documents and the cost sharing agreements executed with Metropolitan Dade County, the project sponsor. Since implementation of Programs and Project Management Division in the Jacksonville District of USACE in the late 1980's, the management of the project has been supported by monthly Project Review Board briefings and updates of the Project Management Board milestone schedules. Monthly conference calls/team meetings with the sponsor have been implemented since the mid 1990's in order to coordinate this project's management on a monthly (and sometimes weekly) basis. As renourishments of portions of the overall project become needed, close coordination is maintained with the other Federal agencies during NEPA coordination in order that all NEPA requirements are known and addressed (and shown as part of the milestone schedules) during the preparation of the documents for the upcoming renourishment contracts. The overall project management plan is to continue to provide for the renourishment of the project throughout project life by the above process.

Comment 6. Suggest the characterization, hardbottom, replace hardground in subsequent documents.

Response: Noted.



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAY 01 2002

Mr. Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Mager:

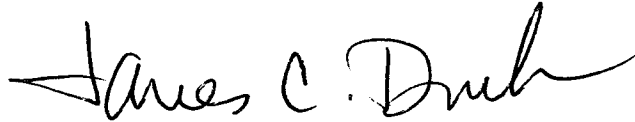
This references the proposed renourishment at Haulover Beach Park, Dade County Beach Erosion Control and Hurricane Protection Project and your letter dated April 4, 2002, providing Essential Fish Habitat (EFH) Conservation Recommendations. This letter serves as our response under Section 305(b)(4) of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

We have reviewed the EFH Conservation Recommendations and concur with your recommendations.

1. Conservation Recommendation 1. The proposed ebb shoal borrow area has been modified to removed the eastern section to provide, at a minimum, a 400-foot-wide buffer area between the borrow area and adjacent hardbottom areas and reefs.
2. Conservation Recommendation 2. Extensive turbidity and sedimentation monitoring and assessment will occur prior to, during and following project construction. Turbidity monitoring for the borrow area and the beach fill area is detailed in the Water Quality Certification (0128781-00-JC) issued on July 27, 2001 by the Florida Department of Environmental Protection (FDEP) and in the U.S. Army Corps of Engineers Contract Plans and Specifications for the project. Sedimentation monitoring of hardbottom/reef areas adjacent to the borrow area will be conducted by the Miami-Dade Department of Environmental Resources Management (DERM). A biological monitoring plan is currently being prepared by DERM and will be similar to the monitoring conducted for the recent renourishments at Sunny Isles and Miami Beach in the vicinity of 63rd Street. The monitoring plan will include both visual surveys of the adjacent reef areas, as well as measuring sediment depths and sedimentation rates.
3. Conservation Recommendation 3. If monitoring indicates that adverse impacts to hardbottom communities have occurred, a mitigation plan will be developed to compensate for those impacts.

If you have any questions or need further information, please contact Mr. Mike Dupes at 904-232-1689.

Sincerely,

A handwritten signature in black ink that reads "James C. Duck". The signature is fluid and cursive, with the first name "James" being the most prominent.

James C. Duck
Chief, Planning Division

Copy Furnished:

Mr. David H. Rackly, National Marine Fisheries Service, 219 Fort Johnson Road,
Charleston, South Carolina 29412-9110

Mr. Michael Johnson, National Marine Fisheries Service, 11420 North Kendall Drive,
Miami, Florida 33176

Mr. Steve Blair, Dade County Department of Environmental Resources Management,
33 SW 2nd Avenue, Suite 1000, Miami, Florida 33130



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

April 4, 2002

James C. Duck, Chief
Planning Division, Environmental Branch
Department of the Army, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232 0019

Dear Mr. Duck:

This responds to your March 7, 2002, request for comments on the draft **Environmental Assessment (EA) for the proposed Renourishment of Haulover Beach Park** in Dade County, Florida. According to your letter, the EA provides your Essential Fish Habitat (EFH) Assessment for the proposed project, as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA).

According to the project description, the proposed action constitutes the second renourishment of Haulover Beach Park and involves placing 114,000 cubic yards of sand along 2,600 linear feet of shoreline. The proposed borrow area for the project is located within the ebb shoal northeast of Bakers Haulover Inlet in 10 to 20 feet of water. Sand material would be dredged from the borrow area using a hydraulic dredge and pumped to the beach disposal site using a submerged pipeline.

The EA includes information regarding existing marine resources in the area of the proposed borrow site and the beach disposal site. According to EA, hard bottom habitat does not occur within the equilibrium toe of the fill or within the proposed pipeline corridor. Although hard bottom habitat is not present within the proposed borrow area, hard bottom reefs have been located approximately 200 feet east of the eastern edge of the borrow area. Since direct impacts to hard bottom resources are not expected, compensatory mitigation is not proposed for the project.

On March 12, 2002, the National Marine Fisheries Service participated in an interagency site inspection of project area. Although hard bottom habitat was not observed within the proposed borrow area or the beach disposal area, hard bottom reefs were found approximately 140 feet east of the eastern edge of the borrow area. These hard bottom reefs appeared to be dominated by sponge and soft corals, and several hard coral colonies were also observed. Discussions with Army Corps



of Engineers (COE) staff indicate that you have recently been made aware of the presence of these resources and, in order to provide an adequate buffer area around the reefs, the COE intends to modify the borrow area.

The proposed project borders and includes areas identified as Essential Fish Habitat (EFH) by the South Atlantic Fishery Management Council (SAFMC). Categories of EFH that occur within the project vicinity include marine water column, live/hard bottoms, coral and coral reefs, algae, and sargassum. Some of the managed species associated with the marine water column include eggs and sub-adult brown and pink shrimp; gag and yellowedge grouper; gray, mutton, lane and schoolmaster snappers; and white grunt. The marine water column and sargassum also have been identified as EFH for pelagic species, including sub-adult/juvenile king and Spanish mackerel, greater amberjack, cobia, and dolphin. Hard bottom/coral reef habitats have been identified as EFH for juvenile and adult gag and yellowedge groupers; and gray and mutton snappers. Sponge, algae, coral and hard bottom habitats have been identified as EFH for juvenile and adult spiny lobster. Likewise, the Mid Atlantic Fishery Management Council (MAFMC) has identified EFH for bluefish, including water column in the project area extending from the coastline to well beyond the construction limits for the project. Detailed information on shrimp, the snapper/grouper complex (containing ten families and 73 species), mackerel, bluefish, dolphin, spiny lobster and other Federally managed fisheries and their EFH is provided in the 1998 generic amendment of the Fishery Management Plans (FMP) for the South Atlantic and Mid Atlantic regions prepared by the SAFMC and MAFMC, respectively. The 1998 amendment was prepared as required by the Magnuson-Stevens Fishery Conservation and Management Act. The NMFS has identified EFH for highly migratory species that utilize the marine water column in this area, including juvenile and adult nurse, lemon, blacktip, great hammerhead, sandbar and bull sharks. In addition, the SAFMC has also designated hard bottom habitat as Habitat Area of Particular Concern (HAPC) for the snapper/grouper complex and spiny lobster, and sargassum for highly migratory pelagic species. HAPCs are subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area.

In addition to EFH for Federally managed species, the marine water column, sargassum, hard bottom, coral, and shallow nearshore habitats provide nursery, foraging, and refuge habitat for other commercially and recreationally important fish and shellfish. Species such as blue crab, flounder, pompano, striped mullet, tarpon, and a variety of reef fish and tropical fish are among the many species that utilize these habitats.

The NMFS has reviewed the EA for the proposed project and we find that some information relevant and necessary for our review of the project was not included in the document. In view of the potential adverse effects of this project to EFH, HAPC, and other NOAA trust resources, the NMFS recommends that the following information should be included in the final EA for the proposed project:

- Although relatively detailed information regarding the alternate borrow area (south of Government Cut) is provided, the information pertaining to the proposed borrow area (ebb shoal)

is not adequate. Geophysical information, including rock/sand cores, and the ranges of sand grain size and silt content within the borrow area should be provided. The dimensions of the proposed borrow area and the sand disposal area should be included.

- Section 3.3 of the draft EA contains a description of beach, sand bottom, and coral reef/hard bottom communities within the project area. Queen conch and spiny lobster should be included as species found in these habitats (the latter is mentioned as a transient species for sand bottom, but is not listed as a species found in hard bottom reefs).
- Information regarding a plan to monitor turbidity and sedimentation effects on hard bottom and coral reef habitats adjacent to the borrow area are not included in the EA. We understand that a detailed monitoring plan has been developed by the Dade County Department of Environmental Resource Management for the proposed project. The monitoring plan should be included in the final EA.
- Section 4 of the EA discusses environmental effects of the proposed project and cites various publications regarding the effects of beach renourishment on marine resources. In the discussion of the effects to nearshore and offshore sand habitat, it is stated that dredge and fill activities result in minimal short-term effects and no long-term effects on infaunal macro-invertebrates. The EA similarly concludes that fish communities would not be impacted by the proposed project. A number of studies conclude that impacts to these communities may be more extensive and long-term than is suggested in earlier assessments for beach nourishment projects. For example, Peterson *et al.* (2000) found significant, short-term, adverse effects on dominant species of beach macro-invertebrates from beach nourishment and bulldozing activities in North Carolina. Re-examination of data from borrow areas and reference areas of four beach renourishment projects on the southeast Florida coast, found that changes to the infaunal community structure may persist for 2-3 years or more (Wilber and Stern 1992). Other studies have shown a decrease in diversity and abundance of the infaunal community in borrow areas several years following the dredging (Turbeville and Marsh 1982; Goldberg 1989). The impact that such projects have on macro-invertebrate communities should be considered as significant since these organisms either directly, or indirectly, comprise a major portion of the diet of many fish and macro-crustaceans (Baird and Ulanowicz 1989). The NMFS recommends that these studies be included in the assessment of environmental effects.
- The EA also concludes that, due to the use of a 200-foot-wide buffer around the borrow area, impacts to hard bottom and coral reef habitats are not expected. However, numerous reports and publications have documented moderate to severe impacts to reefs from turbidity and sedimentation. For example, elevated sediment levels were recorded 1,100 feet from the borrow area in the 1990 Bal Harbor project (immediately south of the proposed project), and were estimated to continue up to 1,200 feet (Blair *et al.* 1990b). Sediment damage to hard bottom and coral reefs have been documented at the Bal Harbor project in 1990. Post-construction surveys conducted for the Bal Harbor project revealed that a total of 24.8 acres of hard bottom reef habitat was impacted by sedimentation, with sediment depths of 1-5 inches. The report estimated

that over 53 percent of the hard coral colonies were killed by sedimentation, equivalent to the loss of 18,279 colonies. Inadequate buffer zones surrounding the borrow areas contributed to the impacts in this project (Blair *et al.* 1990b). Seven years after the completion of the 1971 Hallandale project, persistent turbidity resulted in visibility of less than two meters in the nearshore areas (Courtenay *et al.* 1980). Experimental studies have demonstrated that hard corals are adversely affected at levels below the current Florida administrative threshold of 29 NTUs (Teleniski and Goldberg 1995a; 1995b). In the Bal Harbor project, for example, the turbidity levels were seldom over 3 NTUs, yet 1-5 inches of sediment were deposited over 24.8 acres of hard bottom (Blair *et al.* 1990b). Goldberg (1989) suggested that the minimum distance between the hard bottom area and the borrow site should be the mixing zone dimensions around the dredge head. Use of a hydraulic dredge is proposed for the Haulover Beach project, which should reduce the magnitude and size of turbidity/sediment plumes at the dredge site associated with hopper dredges. However, sediments in this area typically contain high concentrations of soft, calcareous organic material that tends to remain in suspension longer and may travel greater distances. The COE should evaluate these and other relevant publications and reports regarding effects of beach renourishment projects and include these assessments in the final EA.

In view of the potential adverse effects of this project to EFH, HAPC, and other NOAA trust resources, the NMFS provides the following:

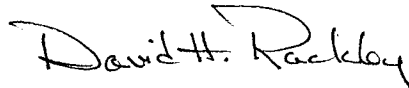
EFH Conservation Recommendations

1. The proposed borrow area should be modified to eliminate the eastern “dogleg” section and provide, at a minimum, a 400-foot-wide buffer between the borrow area and adjacent hard bottom reefs.
2. A monitoring plan should be implemented to assess turbidity and sedimentation impacts on adjacent hard bottom reefs. The plan should include monitoring during and after construction and use of fixed and random monitoring stations at the hard bottom reef adjacent to the borrow area. In addition to a photographic record of benthic communities, a quantifiable method of measuring sedimentation on the reef should be used, such as traps or plates, that can be used to determine accumulated sediment on the reef. In addition, indicators of stress or mortality to benthic, sessile organisms should be recorded. Post-construction monitoring events be conducted immediately following, six months, and one year after project completion to assess potential adverse impacts on benthic communities.
3. If monitoring data indicate occurrence of adverse impacts to hard bottom communities, a plan for providing full compensation for unavoidable adverse impacts to hard bottom, coral, and other sensitive nearshore habitats should be developed and made available for NMFS review. The plan should address compensation for the loss productivity and habitat availability incurred during the period between elimination of hard bottom habitat and establishment of a viable replacement reef.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and the NMFS's implementing regulation at 50 CFR Section 600.920(k) require your office to provide a written response to this letter within 30 days of its receipt. If it is not possible to provide a substantive response within 30 days, in accordance with our "findings" with the your Regulatory Functions Branch, an interim response should be provided to the NMFS. A detailed response then must be provided prior to final approval of the action. Your detailed response must include a description of measures proposed by your agency to avoid, mitigate, or offset the adverse impacts of the activity. If your response is inconsistent with our EFH Conservation Recommendations, you must provide a substantive discussion justifying the reasons for not following the recommendations.

We appreciate the opportunity to provide these comments. Related correspondence should be addressed to the attention of Mr. Mike Johnson at our Miami Office. He may be reached at 11420 North Kendall Drive, Suite #103, Miami, Florida 33176, or by telephone at (305) 595-8352.

Sincerely,



for

Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

cc:

EPA, WPB
DEP, WPB
FFWCC, TALL
FWS, VERO
F/SER4
F/SER43-Johnson

Literature Cited

- Baird, D. and R. E. Ulanowicz. 1989. The seasonal dynamics of the Chesapeake Bay ecosystem. *Ecol. Monogr.* 59:329-364.
- Blair, S. M., B. S. Flynn, T. McIntosh, and L. Hefty. 1990. Environmental impacts of the 1990 Bal Harbor beach renourishment project: mechanical and sedimentation impact on hard-bottom areas adjacent to the borrow area. Metro Dade DERM Tech. Rep. 90-15. 52 pp.
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- Teleniski, G. J. and W. M. Goldberg. 1995a. Effects of turbidity on the photosynthesis and respiration of two South Florida reef coral species. *Bull. Mar. Sci.* 57(2):527-539.
- Teleniski, G. J. and W. M. Goldberg. 1995b. Comparison of turbidity measurements by transmissometry and its relevance to water quality standards. *Bull. Mar. Sci.* 57(2):540-547.
- Turbeville, D. B. and G. A. Marsh. 1982. Benthic fauna of an offshore borrow area in Broward County, Florida. U.S. Army Corps of Engineers Coastal Engineering Research Center. Misc. Rep. 82-1. p. 1-43.
- Wilber, P. and M. Stern. 1992. A re-examination of infaunal studies that accompany beach renourishment projects. *In* S. Tait (ed.), Proc. 1992 National Conf. Beach Preserv. Technol., FL. Shore and Beach Preserv. Assoc. Tallahassee, FL. p. 242-257.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

MAR 26 2002

District Engineer, Jacksonville
P.O. Box 4970
Jacksonville, FL 32232

ATTN: Mr. James Duck, Chief
Planning Division

Subject: Environmental Assessment (EA) for the Beach Erosion Control and
Hurricane Protection Project at Haulover Beach Park (Park) in Brevard
County, FL

Dear Sir:

Pursuant to Section 309 of the Clean Air Act, EPA, Region 4 has reviewed the proposal to renourish approximately 2,600' of the Park's beach (southward from its border with Sunny Isle). The nourishment material will be obtained within the ebb shoal northeast of Bakers Haulover Inlet. The following information is provided for your use in finalizing the "Finding of No Significant Impact":

1. Page 1, Description of Proposed Action 1.4. From a cost perspective use of the ebb shoal at Bakers Haulover Inlet as a sand source is appealing given its proximity. However, the borrow area is only in 10-20' of water; hence, we are concerned about how removal of 114,000 cubic yards of material from just offshore will affect adjacent transport processes. We understand that some shoal will remain to provide wave refraction, but this action could well be a short-term "fix" which results in a long-term problem. If Figure 4 is in scale, then it appears that at least half of the foot print of the borrow site will be mined in this dredging cycle.
2. Page 8, Alternatives 2.1.1 States no *hardgrounds* are located within the borrow area, and no *hardgrounds* occur within 200 feet of the eastern tip of the borrow area. EPA recommends that a 400-foot buffer zone be placed between the borrow area and any nearby hardbottom reefs. The buffer zone would reduce the risk of adverse impacts to hardbottom reefs from turbidity and sediment plumes that may be transported from the dredge site.
3. Page 10, Table 1: Summary of Direct and Indirect Impacts for Alternatives

Considered. Under proposed EBB Shoal Borrow Area (Row 2, Column 3) there is the statement that no impact(s) to *hardground* communities are expected, rather it should state the same effects as listed under alternative Borrow Areas South of Government Cut (potential sedimentation, turbid, and mechanical impacts). Note: The EBB Shoal Borrow Area is located 200 feet from the nearest *hardground* whereas Borrow Areas South of Government Cut is located 400 feet from the nearest *hardground*.

4. Page 18, Beach Renourishment Activities: States minimal impacts to nearshore hardbottom communities are expected by sand placement (i.e, disposal) on the beach due to the distance of the reefs to the shore. In conjunction with the Coast of Florida Erosion and Storm Effects Study, the *hardground* areas offshore of Dade County were mapped using side scan sonar. In addition, aerial photography flown in July 1997 has also been used to map the nearshore *hardground*. The closest *hardground* community in the vicinity of the proposed beach fill at Haulover Park is in excess of 800 feet. EPA requests that the U.S. Army Corps of Engineers conduct a new hardbottom resource survey of the borrow areas and beach renourishment site. Information provided in the Coast of Florida Study and review of 1997 aerial photography may not accurately portray present site conditions. The Coast of Florida Study was not designed or intended to identify the hardbottom resources located along the coast. The EA should also include a map and description of the nearshore hardbottom resources located within the project boundaries.

5. The EA needs to address the long-term management of the proposed project.

6. Suggest the characterization, *hardbottom*, replace *hardground* in subsequent documents

Thank you for the opportunity to comment on this action. If we can be of further assistance, Mr. Ron Miedema (561-616-8741) will serve as initial point of contact.

Sincerely,

A handwritten signature in black ink, appearing to read "Heinz Mueller", with a stylized, flowing script.

Heinz J. Mueller, Chief
Office of Environmental Assessment
Environmental Accountability Division

DIVISIONS OF FLORIDA DEPARTMENT OF STATE
Office of the Secretary
Office of International Relations
Division of Elections
Division of Corporations
Division of Cultural Affairs
Division of Historical Resources
Division of Library and Information Services
Division of Licensing
Division of Administrative Services



MEMBER OF THE FLORIDA CABINET
State Board of Education
Trustees of the Internal Improvement Trust Fund
Administration Commission
Florida Land and Water Adjudicatory Commission
Siting Board
Division of Bond Finance
Department of Revenue
Department of Law Enforcement
Department of Highway Safety and Motor Vehicles
Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE
Katherine Harris
Secretary of State
DIVISION OF HISTORICAL RESOURCES

Mr. James C. Duck
Planning Division, Environmental Branch
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32399-0250

March 21, 2002

RE: DHR Project File Number: 2002-2329 / Received by DHR: March 11, 2002
Draft Environmental Assessment for the Second Periodic Renourishment at
Haulover Beach Park, Dade County Beach Erosion Control and
Hurricane Protection Project
Dade County, Florida

Dear Mr. Duck:

Our office has received and reviewed the above referenced project in accordance with Section 106 of the *National Historic Preservation Act of 1966* (Public Law 89-665), as amended in 1992, and 36 C.F.R., Part 800: *Protection of Historic Properties*. The State Historic Preservation Officer is to advise and assist federal agencies when identifying historic properties (listed or eligible for listing, in the National Register of Historic Places), assessing effects upon them, and considering alternatives to avoid or reduce the project's effect on them.

Our review of the draft Environmental Assessment indicates that no historic properties at Haulover Beach Park, onshore and in the underwater borrow area, will be affected by this project. We concur with this finding.

If there are any questions concerning our comments, please contact Allison McCarthy, Historic Sites Specialist, by electronic mail at amccarthy@mail.dos.state.fl.us or at 850-245-6333 or 800-847-7278. Thank you for your interest in protecting Florida's historic properties.

Sincerely,

Frederick P. Gache, Deputy SHPO

for Janet Snyder Matthews, Ph.D., Director, and
State Historic Preservation Officer

500 S. Bronough Street • Tallahassee, FL 32399-0250 • <http://www.flheritage.com>

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☒ Historic Preservation
(850) 245-6333 • FAX: 245-6437

☐ Historical Museums
(850) 245-6400 • FAX: 245-6433

☐ Palm Beach Regional Office
(561) 279-1475 • FAX: 279-1476

☐ St. Augustine Regional Office
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☐ Tampa Regional Office
(813) 272-3843 • FAX: 272-2340



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAR 07 2002

TO WHOM IT MAY CONCERN:

Enclosed for your review and comment is a copy of the draft Environmental Assessment for the Second Periodic Renourishment at Haulover Beach Park, Dade County Beach Erosion Control and Hurricane Protection Project.

Any comments you may have must be submitted in writing to the letterhead address within 30 days of the date of this letter. Any questions concerning the project should be directed to Mr. Mike Dupes at 904-232-1689, fax at 904-232-3442 or e-mail at michael.dupes@saj02.usace.army.mil.

Sincerely,

A handwritten signature in black ink, reading "James C. Duck", is positioned above the typed name.

James C. Duck
Chief, Planning Division

Enclosure

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780 NE 69TH STREET #1703
MIAMI FL 33138

Address list for circulation of Draft Environmental Assessment (EA) or Notice of Availability (NOA) of Draft EA for the Second Periodic Renourishment at Haulover Beach Park, Dade County BEC & HP Project. Those addressees marked with EA will receive copies of the EA. All others will receive a NOA of the Draft EA and Preliminary FONSI.

FLORIDA SHORE & BEACH PRES ASSOC
2952 WELLINGTON CIRCLE
TALLAHASSEE FL 32308

MS DIMI EVERETTE
HAULOVER BEACH PRESERVATION SOC
8270 SW 149TH CT #205
MIAMI FL 33193

MS SHIRLEY MASON
NATURIST EDUCATION FOUNDATION
1316 NE 105TH STREET SUITE 104
MIAMI SHORES FL 33138

MR RICHARD MASON
DIRECTOR
SOUTH FLORIDA FREE BEACHES INC.
PO BOX 330902
COCONUT GROVE FL 33133

MR BRUCE FRENDAHL
SOUTH FLORIDA FREE BEACHES
PO BOX 330902
COCONUT GROVE FL 33133

GENERAL MANAGER
SHERATON BAL HARBOUR BEACH RES.
9701 COLLINS AVENUE
BAL HARBOUR FL 33154

GENERAL MANAGER
BALMORAL CONDOMINIUM
9801 COLLINS AVENUE
BAL HARBOUR FL 33154

SEA VIEW HOTEL INC.
9909 COLLINS AVENUE
BAL HARBOUR FL 33154

GENERAL MANAGER
BAL HARBOUR TOWER CONDOMINIUM
9999 COLLINS AVENUE
BAL HARBOUR FL 33154

GENERAL MANAGER
BAL HARBOUR 101 CONDOMINIUM
10155 COLLINS AVENUE
BAL HARBOUR FL 33154

GENERAL MANAGER
THE TIFFANY OF BAL HARBOUR CONDO
10175 COLLINS AVENUE
BAL HARBOUR FL 33154

BAL HARBOUR CLUB INIC.
10201 COLLINS AVENUE
BAL HARBOUR FL 33154

GENERAL MANAGER
KENILWORTH CONDOMINIUM
10205 COLLINS AVENUE
BAL HARBOUR FL 33154

GENERAL MANAGER
CARLTON TERRACE CONDOMINIUM
10245 COLLINS AVENUE
BAL HARBOUR FL 33154

Address list for circulation of Draft Environmental Assessment (EA) or Notice of Availability (NOA) of Draft EA for the Second Periodic Renourishment at Haulover Beach Park, Dade County BEC & HP Project. Those addressees marked with EA will receive copies of the EA. All others will receive a NOA of the Draft EA and Preliminary FONSI.

**GENERAL MANAGER
HARBOUR HOUSE SOUTH
10275 COLLINS AVENUE
BAL HARBOUR FL 33154**

**GENERAL MANAGER
HARBOUR HOUSE NORTH
10295 COLLINS AVENUE
BAL HARBOUR FL 33154**

**GENERAL MANAGER
PLAZA OF BAL HARBOR CONDOMINIUM
10185 COLLINS AVENUE
BAL HARBOUR FL 33154**

**RADISSON AVENTURA BEACH RESORT
19201 COLLINS AVENUE
SUNNY ISLES FL 33160**

**GENERAL MANAGER
GOLDEN NUGGET RESORT
18555 COLLINS AVENUE
SUNNY ISLES FL 33160**

**PRESIDENT
MIAMI BEACH CONDOMINIUM ASSOC.
19051 COLLINS AVENUE
SUNNY ISLES FL 33160**

**GOLDEN SHORES PROP. OWNERS ASSOC.
320 190TH STREET
SUNNY ISLES FL 33160**

**SEASHORE CLUB
18975 COLLINS AVENUE
SUNNY ISLES FL 33160**

**CHATEAU BY THE SEA
19115 COLLINS AVENUE
SUNNY ISLES FL 33160**

**OCEAN ROC RESORT MOTEL
19505 COLLINS AVENUE
SUNNY ISLES FL 33160**

**THUNDERBIRD RESORT HOTEL
18401 COLLINS AVENUE
SUNNY ISLES FL 33160**

**TANGIERS RESORT HOTEL
18695 COLLINS AVENUE
SUNNY ISLES FL 33160**

**BEACH HARBOR RESORT HOTEL
18925 COLLINS AVENUE
SUNNY ISLES FL 33160**

**EXECUTIVE DIRECTOR
SUNNY ISLES RESORT ASSOCIATION
17100 COLLINS AVENUE SUITE 217
SUNNY ISLES FL 33160**

Address list for circulation of Draft Environmental Assessment (EA) or Notice of Availability (NOA) of Draft EA for the Second Periodic Renourishment at Haulover Beach Park, Dade County BEC & HP Project. Those addressees marked with EA will receive copies of the EA. All others will receive a NOA of the Draft EA and Preliminary FONSI.

**PROFESSOR JOHN GIFFORD
RASMAS - UNIVERSITY OF MIAMI
4600 RICKENBACKER CAUSEWAY
MIAMI FL 33149-1098**

Address list for circulation of Draft Environmental Assessment (EA) or Notice of Availability (NOA) of Draft EA for the Second Periodic Renourishment at Haulover Beach Park, Dade County BEC & HP Project. Those addressees marked with EA will receive copies of the EA. All others will receive a NOA of the Draft EA and Preliminary FONSI.



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAR 07 2002

TO WHOM IT MAY CONCERN:

Pursuant to the National Environmental Policy Act and U.S. Army Corps of Engineers Regulation (33 CFR 230.11), this letter constitutes the Notice of Availability of the draft Environmental Assessment (EA) and preliminary Finding of No Significant Impact (FONSI) for the proposed renourishment at Haulover Beach Park, Dade County Beach Erosion Control and Hurricane Protection Project. A copy of the preliminary FONSI is enclosed.

The purpose of the project is to prevent or reduce loss of public beachfront to continuing erosional forces and to prevent or reduce periodic damages and potential risk to life, health and property in the developed lands adjacent to the beach. Approximately 114,000 cubic yards of beach quality sand is proposed for placement along 2,600 feet segment of shoreline at the north end of Haulover Beach Park in Dade County, Florida.

Any comments you may have must be submitted in writing to the letterhead address within 30 days of the date of this letter. Questions concerning the project or requests for copies of the draft EA should be directed to Mr. Mike Dupes at 904-232-1689, fax 904-232-3442 or e-mail at michael.dupes@saj02.usace.army.mil. Copies of the draft EA will be available for public review at the reference desk of the Miami Beach Branch Public Library, 2100 Collins Avenue, Miami Beach, Florida. The point of contact at the library is Ms. Reaette King-Kee at 305-535-4219.

Sincerely,

A handwritten signature in black ink, reading "James C. Duck", is positioned below the "Sincerely," text.

James C. Duck
Chief, Planning Division

Enclosure

**PRELIMINARY
FINDING OF NO SIGNIFICANT IMPACT**

**SECOND PERIODIC RENOURISHMENT
AT HAULOVER BEACH PARK**

**BEACH EROSION CONTROL AND
HURRICANE PROTECTION PROJECT
DADE COUNTY, FLORIDA**

I have reviewed the Environmental Assessment (EA) for the proposed action. This Finding incorporates by reference all discussions and conclusions contained in the Environmental Assessment enclosed hereto. Based on information analyzed in the EA, reflecting pertinent information obtained from agencies having jurisdiction by law and/or special expertise, I conclude that the proposed action will not significantly impact the quality of the human environment and does not require an Environmental Impact Statement. Reasons for this conclusion are in summary:

a. The proposed action would restore a section of severely eroded beach at Haulover Beach Park in Dade County, Florida thus preventing or reducing loss of public beachfront to continuing erosional forces and preventing or reducing periodic damages and potential risk to life, health and property in the developed lands adjacent to the beach.

b. Measures to prevent or minimize impacts to sea turtles in accordance with Biological Opinions from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service will be implemented during and after project construction. To protect the manatee, all water-based activities would follow standard manatee protection measures. There would be no adverse impacts to other Federally listed endangered or threatened species.

c. Based on historic property field investigations, no potentially significant cultural resources are located in the proposed offshore borrow area. No significant historical properties have been identified on the segment of beach proposed for renourishment.

d. The Florida Department of Environmental Protection on July 27, 2001 issued Water Quality Certification (Permit No. 0128781-00-JC), pursuant to Section 401 of the Clean Water Act.

e. Measures to eliminate, reduce, or avoid potential impacts to fish and wildlife resources include the following: (1) A buffer zone with a minimum distance from any hardbottom has been established for the proposed borrow area, (2) Visual inspections of hardbottom in proximity to the dredging area would be routinely conducted to look for any indicators of turbidity, sedimentation or mechanical impacts, (3) Extensive turbidity monitoring would be performed at the beach fill and dredging

sites during construction to ensure turbidity levels do not exceed the State water quality standard, (4) To avoid mechanical damage to hardbottom habitat associated with dredging, precision electronic positioning equipment would be used to ensure the dredge remains in the borrow area during dredging operations.

Date

James G. May
Colonel, U.S. Army
District Engineer



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAR 07 2002

Mr. Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division
National Marine Fisheries Service
9721 Executive Center Drive North
St. Petersburg, Florida 33702

Dear Mr. Mager:

Pursuant to the National Environmental Policy Act (NEPA), enclosed for your review and comment is a copy of the draft Environmental Assessment (EA) for the Second Periodic Renourishment at Haulover Beach Park, Dade County Beach Erosion Control and Hurricane Protection Project. The EA also constitutes our Essential Fish Habitat (EFH) Assessment as required by the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act (MSFMCA). With this letter we are initiating EFH consultation with your agency.

We request your comments pursuant to NEPA and MSFMCA within 30 days. If you have any questions or need further information, please contact Mr. Mike Dupes at 904-232-1689, fax at 904-232-3442 or e-mail at michael.dupes@saj02.usace.army.mil.

Sincerely,

James C. Duck
Chief, Planning Division

Copies Furnished:

Mr. David H. Rackly, National Marine Fisheries Service, 219 Fort Johnson Road,
Charleston, South Carolina 29412-9110

Mr. Michael Johnson, National Marine Fisheries Service, 11420 North Kendall Drive,
Miami, Florida 33176



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

Planning Division
Environmental Branch

MAR 07 2002

Ms. Reaette King-Kee
Miami Beach Branch Library
2100 Collins Avenue
Miami Beach, Florida 33139

Dear Ms. King-Kee:

Enclosed are two copies of the Draft Environmental Assessment on the Beach Erosion Control and Hurricane Protection Project, Dade County Florida, Second Periodic Renourishment at Haulover Beach Park. These are being provided for public review pursuant to the National Environmental Policy Act. We request that you make these copies available for public viewing in the reference section of your library for a period of 90 days, after which they may be disposed.

Thank you for your assistance in this matter. If you have any questions or need further information, please contact Mr. Mike Dupes at 904-232-1689.

Sincerely,

A handwritten signature in black ink, reading "James C. Duck", is positioned above the typed name.

James C. Duck
Chief, Planning Division

Enclosures



United States Department of the Interior

FISH AND WILDLIFE SERVICE
South Florida Ecological Services Office
P.O. Box 2676
Vero Beach, Florida 32961-2676



October 4, 2000

James C. Duck
Chief, Planning Division
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Service Log No.: 4-1-00-F-701
Cross Reference No.: 4-1-96-F-268
Public Notice Date: June 1, 2000
Project: 63rd Street Renourishment
Local Sponsor: Miami-Dade County
County: Miami-Dade

Dear Mr. Duck:

The Fish and Wildlife Service (Service) has reviewed the plans submitted for the project referenced above. The project has the potential to affect four species of sea turtles. Florida's beaches function as nesting habitat for the threatened loggerhead turtle (*Caretta caretta*) as well as the endangered green turtle (*Chelonia mydas*), leatherback turtle (*Dermochelys coriacea*), and hawksbill turtle (*Eretmochelys imbricata*).

Your letter, dated June 5, 2000, states that the Biological Opinion (BO) dated October 24, 1996, for Region III of the Coast of Florida Erosion and Storm Effects Study includes the project area considered for the proposed renourishment. You also proposed that the "Reasonable and Prudent Measures" and "Terms and Conditions" listed in the BO that are applicable for Miami-Dade County apply to the proposed renourishment, and that you plan to incorporate these requirements into the project plans and specifications and any contracts as appropriate. You also requested concurrence on this determination. This letter is provided in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (ESA).

The Coast of Florida Biological Opinion, dated October 24, 1996, is a Programmatic Biological Opinion that addresses beach nourishment impacts to sea turtles in Palm Beach, Broward, and Miami-Dade counties. The BO states that separate biological opinions will be prepared for individual projects as more advanced planning and information becomes available.

The Service agrees with the determination that the project limits are within the area defined in the Coast of Florida BO, however, Service guidance on section 7 consultations on sea turtles has been revised and has resulted in project specific changes in the “Reasonable and Prudent Measures” and “Terms and Conditions” of the Coast of Florida BO. The following sections of the Coast of Florida BO have been changed. All other parts of the Coast of Florida BO are applicable to the 63rd Street Renourishment Project.

Lighting Term and Condition (Term and Condition 7)

From April 1 to November 30, all on-beach lighting associated with the project shall be limited to the immediate area of active construction only and shall be the minimal lighting necessary to comply with safety requirements. Shielded low pressure sodium vapor lights are recommended to minimize illumination of the nesting beach and nearshore waters. Lighting on offshore equipment shall be minimized through reduction, shielding, lowering, and appropriate placement of lights to avoid excessive illumination of the water, while meeting all U.S. Coast Guard and OSHA requirements. Shielded low pressure sodium vapor lights are highly recommended for lights on offshore equipment that cannot be eliminated.

Incidental Take Statement

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document,

the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps must report the progress of the action and its impacts on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Incidental Take

The Service has reviewed the biological information and other information relevant to this action. Based on this review, incidental take is anticipated for (1) all sea turtle nests that may be constructed and eggs that may be deposited and missed by a nest survey and egg relocation program within the boundaries of the proposed project; (2) all sea turtle nests deposited during the period when a nest survey and egg relocation program is not required to be in place within the boundaries of the proposed project; (3) harassment in the form of disturbing or interfering with female turtles attempting to nest within the construction area or on adjacent beaches as a result of construction activities; (4) disorientation of hatchling turtles on beaches adjacent to the construction area as they emerge from the nest and crawl to the water as a result of project lighting; (5) behavior modification of nesting females due to escarpment formation within the project area during a nesting season, resulting in false crawls or situations where they choose marginal or unsuitable nesting areas to deposit eggs; (6) all nests destroyed as a result of escarpment leveling within a nesting season when such leveling has been approved by the Fish and Wildlife Service; and (7) reduced hatching success due to egg mortality during relocation and adverse conditions at the relocation site

Incidental take is anticipated for only 0.53 miles (2,800 feet) of beach that have been identified for sand placement. The Service anticipates incidental take of sea turtles will be difficult to detect for the following reasons: (1) the turtles nest primarily at night and all nests are not found because [a] natural factors, such as rainfall, wind, and tides may obscure crawls and [b] human-caused factors, such as pedestrian and vehicular traffic, may obscure crawls, and result in nests being destroyed because they were missed during a nesting survey and egg relocation program; (2) the total number of hatchlings per undiscovered nest is unknown; (3) the reduction in percent hatching and emerging success per relocated nest over the natural nest site is unknown; (4) an unknown number of females may avoid the project beach and be forced to nest in a less than optimal area; (5) lights may disorient an unknown number of hatchlings and cause death; and (6) escarpments may form and cause an unknown number of females from accessing a suitable nesting site. However, the level of take of these species can be anticipated by the disturbance and renourishment of suitable turtle nesting beach habitat because: (1) turtles nest within the project site; (2) beach renourishment will likely occur during a portion of the nesting season; (3) the renourishment project will modify the incubation substrate, beach slope, and sand compaction; and (4) artificial lighting will disorient nesting females and hatchlings.


Terms and Conditions - Summation Paragraph

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. The amount or extent of incidental take for sea turtles will be considered exceeded if the project results in more than a one-time placement of sand on the 0.53 miles (2,800 feet) of beach proposed for nourishment. If during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

This concludes formal consultation with the Service for the 63rd Street Beach Renourishment Project. Thank you for your cooperation in the effort to protect threatened and endangered sea turtles and their nesting habitat. We are available to meet with agency representatives to resolve outstanding resource issues associated with this project. If you have any questions, please contact Mr. Allen Webb at (561) 562-3909 extension 246.

Sincerely yours,



 James J. Slack
Field Supervisor
South Florida Ecological Services Office

cc:

NMFS, Mike Johnson, Miami, FL (w/o enclosure)
EPA, West Palm Beach, FL (w/o enclosure)
Service, Sandy Macpherson, Jacksonville, FL (w/o enclosure)
FWC, Robbin Trindell, Tallahassee, FL (w/o enclosure)
FDEP, Keith J. Mille, Tallahassee, FL (w/o enclosure)
Miami-Dade County DERM, Miami, FL (w/o enclosure)



STATE OF FLORIDA
DEPARTMENT OF COMMUNITY AFFAIRS

"Dedicated to making Florida a better place to call home"

JEB BUSH
Governor

STEVEN M. SEIBERT
Secretary

March 27, 2000

Mr. James C. Duck, Chief
Department of the Army
Jacksonville District Corps of Engineers
Planning Division
Post Office Box 4970
Jacksonville, Florida 32232-0019

RE: Department of the Army - District Corps of Engineers -
Public Notice - Renourishment at Haulover Beach Park -
Dade County Beach Erosion Control and Hurricane
Protection Project - Miami-Dade County, Florida
SAI: FL200002080063C

Dear Mr. Duck:

The Florida State Clearinghouse, pursuant to Presidential Executive Order 12372, Gubernatorial Executive Order 95-359, the Coastal Zone Management Act, 16 U.S.C. §§ 1451-1464, as amended, and the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335, 4341-4347, as amended, has coordinated a review of the above-referenced project.

Based on the information contained in the application and the enclosed comments provided by our reviewing agencies, the state has determined that, at this stage, the above-referenced project is consistent with the Florida Coastal Management Program. The South Florida Water Management District notes that, under the operating agreement between the Department of Environmental Protection (DEP) and the water management districts, this project will be reviewed by DEP. A final determination will be made during the state's permit review. All comments received to date from our reviewing agencies, and the South Florida Regional Planning Council, are enclosed for your review.

2555 SHUMARD OAK BOULEVARD • TALLAHASSEE, FLORIDA 32399-2100

Phone: 850.488.8466/Suncom 278.8466 FAX: 850.921.0781/Suncom 291.0781

Internet address: <http://www.dca.state.fl.us>

CRITICAL STATE CONCERN FIELD OFFICE
2796 Overseas Highway, Suite 212
Marathon, FL 33050-2227
(305) 289-2402

COMMUNITY PLANNING
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-2356

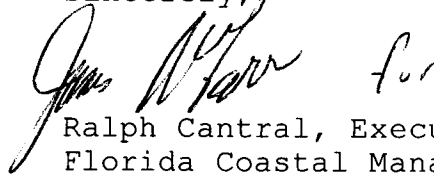
EMERGENCY MANAGEMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 413-9969

HOUSING & COMMUNITY DEVELOPMENT
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 488-7956

Mr. James C. Duck
March 27, 2000
Page Two

Thank you for the opportunity to review this application.
If you have any questions regarding this letter, please contact
Ms. Cherie Trainor, Clearinghouse Coordinator, at (850) 922-5438.

Sincerely,

A handwritten signature in dark ink, appearing to read "Ralph Cantral", followed by a small flourish.

Ralph Cantral, Executive Director
Florida Coastal Management Program

RC/cc

Enclosures

cc: Jim Golden, South Florida Water Management District
Eric Silva, South Florida Regional Planning Council

Y: Miami-Dade

DATE: 02/08/2000

COMMENTS DUE-3 WKS: 03/01/2000

CLEARANCE DUE DATE: 03/23/2000

SAI#: FL200002080063C

Message:

STATE AGENCIES

WATER MANAGEMENT DISTRICTS

OPB POLICY UNITS

Community Affairs
X Environmental Protection
Fish & Wildlife Conserv. Comm
State
Transportation

South Florida WMD

Environmental Policy/C & ED

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FEB 10 2000
State of Florida Clearinghouse

FEB 10

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

— Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

— Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

— Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of the Army - District Corps of Engineers - Public Notice - Renourishment at Haulover Beach Park - Dade County Beach Erosion Control and Hurricane Protection Project - Miami-Dade County, Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

Federal Consistency

☐ No Comment
☐ Comments Attached
☐ Not Applicable

☒ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:

Division/Bureau: OL GA / OIP

Reviewer: Robert Jan

Date: 3/7/00

COUNTY: Miami-Dade

DATE: 02/08/2000

COMMENTS DUE-2 WKS: 02/23/2000

CLEARANCE DUE DATE: 03/23/2000

SAI#: FL200002080063C

Message:

STATE AGENCIES

WATER MANAGEMENT DISTRICTS

OPB POLICY UNITS

Community Affairs
Environmental Protection
Fish & Wildlife Conserv. Comm
X State
Transportation

South Florida WMD

Environmental Policy/C & ED

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2000-1055

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00 FEB 11 AM 10:02

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Project Description:

Department of the Army - District Corps of Engineers - Public Notice - Renourishment at Haulover Beach Park - Dade County Beach Erosion Control and Hurricane Protection Project - Miami-Dade County, Florida.

To: Florida State Clearinghouse

Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

☒ No Comment
☐ Comments Attached
☐ Not Applicable

Federal Consistency

☒ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:

Division/Bureau: *Dr. Historical Resources / Bureau of Historic Preservation*

Reviewer: *Brian Yates*

Date: *2/24/00*

Survey 846

BECAUT / NO SITS

Janet Gayde Matthews 2/24/2000

COUNTY: Miami-Dade

DATE: 02/08/2000

COMMENTS DUE-2 WKS: 02/23/2000

CLEARANCE DUE DATE: 03/23/2000

SAI#: FL200002080063C

Message: -

STATE AGENCIES

WATER MANAGEMENT DISTRICTS

OPB POLICY UNITS

Community Affairs
Environmental Protection
Fish & Wildlife Conserv. Comm
State
X Transportation

South Florida WMD

Environmental Policy/C & ED

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— Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

— Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of the Army - District Corps of Engineers - Public Notice - Renourishment at Haulover Beach Park - Dade County Beach Erosion Control and Hurricane Protection Project - Miami-Dade County, Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

- ☐ No Comment
☐ Comments Attached
☐ Not Applicable

Federal Consistency

- ☐ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:

Division/Bureau: Db Planning & also EMOReviewer: Marjorie BixbyDate: 02-23-00

COUNTY: Miami-Dade

DATE: 02/08/2000

COMMENTS DUE-2 WKS: 02/23/2000

Message:

CLEARANCE DUE DATE: 03/23/2000

SAT#: FL200002080063C

STATE AGENCIES

WATER MANAGEMENT DISTRICTS

OPB POLICY UNITS

Community Affairs
Environmental Protection
Fish & Wildlife Conserv. Comm
State
Transportation

X South Florida WMD

Environmental Policy/C & ED

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FEB 14 2000

REGULATION DEPT. - 401

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

- Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.
- X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.
- Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.
- Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of the Army - District Corps of Engineers - Public Notice - Renourishment at Haulover Beach Park - Dade County Beach Erosion Control and Hurricane Protection Project - Miami-Dade County, Florida.

To: Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100
(850) 922-5438 (SC 292-5438)
(850) 414-0479 (FAX)

EO. 12372/NEPA

Federal Consistency

- ☐ No Comment
☐ Comments Attached
☒ Not Applicable

- ☐ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☒ Not Applicable

UNDER THE OPERATING AGREEMENT BETWEEN DEP AND THE WMDs,
THIS PROJECT WILL BE REVIEWED BY DEP.

From:

Division/Bureau: ENVIRONMENTAL RESOURCE REGULATION

Reviewer: JIM GOLDEN

Date: 2/14/00

Cumme
COUNTY: Miami-Dade

DATE: 02/08/2000

COMMENTS DUE-2 WKS: 02/23/2000

CLEARANCE DUE DATE: 03/23/2000

SAI#: FL200002080063C

Message:

STATE AGENCIES

Community Affairs
Environmental Protection
Fish & Wildlife Conserv. Comm
State
Transportation

WATER MANAGEMENT DISTRICTS

South Florida WMD

RECEIVED
FEB 11 2000

OFFICE OF PLANNING
& BUDGETING
ENVIRONMENTAL POLICY UNIT

OPB POLICY UNITS

X Environmental Policy/C & ED

RECEIVED
FEB 24 2000
State of Florida Clearinghouse

The attached document requires a Coastal Zone Management Act/Florida Coastal Management Program consistency evaluation and is categorized as one of the following:

— Federal Assistance to State or Local Government (15 CFR 930, Subpart F). Agencies are required to evaluate the consistency of the activity.

X Direct Federal Activity (15 CFR 930, Subpart C). Federal Agencies are required to furnish a consistency determination for the State's concurrence or objection.

— Outer Continental Shelf Exploration, Development or Production Activities (15 CFR 930, Subpart E). Operators are required to provide a consistency certification for state concurrence/objection.

— Federal Licensing or Permitting Activity (15 CFR 930, Subpart D). Such projects will only be evaluated for consistency when there is not an analogous state license or permit.

Project Description:

Department of the Army - District Corps of Engineers - Public Notice - Renourishment at Haulover Beach Park - Dade County Beach Erosion Control and Hurricane Protection Project - Miami-Dade County, Florida.

To: Florida State Clearinghouse

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2555 Shumard Oak Boulevard
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EO. 12372/NEPA

- ☒ No Comment
☐ Comments Attached
☐ Not Applicable

Federal Consistency

- ☐ No Comment/Consistent
☐ Consistent/Comments Attached
☐ Inconsistent/Comments Attached
☐ Not Applicable

From:

Division/Bureau:

Reviewer:

Date:

OPB/Env. Policy
Carlane Johnson
2-22-00



March 1, 2000

MAR 01 2000

State of Florida Clearinghouse

Ms. Cherie Trainor
Florida State Clearinghouse
Department of Community Affairs
2555 Shumard Oak Boulevard
Tallahassee, FL 32399-2100

RE: SFRPC #00-0216, SAI #FL200002080063 - Response to a request for comments on the Haulover Beach Park segment of the Miami-Dade County Beach Erosion Control and Hurricane Protection Project, Department of the Army, Miami-Dade County.

Dear Ms. Trainor:

We have reviewed the above-referenced project and have the following comments:

- The project methodology and design, as proposed, is generally consistent with the goals and policies of the *Strategic Regional Policy Plan for South Florida* (SRPP). Council staff supports the implementation of beach renourishment projects for the purposes of providing storm protection for upland property, restoring dunes and maintaining eroding beaches.
- Beaches and dune systems are identified as natural resources of regional significance in the SRPP. Staff supports the use of buffer zones to protect these important resources. Sand movement and downdrift erosion should be monitored on a region wide basis to ensure the livelihood of wildlife habitats and the stability of the project area. All actions should be consistent with the goals and policies of the Miami-Dade County comprehensive plan.
- Staff recommends that, if the proposed actions are implemented, 1) impacts to the natural systems be minimized to the greatest extent feasible and 2) the permit grantor determine the extent of sensitive marine life and vegetative communities in the vicinity of each project and require protection and or mitigation of disturbed habitat. These guidelines will assist in reducing the cumulative impacts to native plants and animals, wetlands and deep-water habitat and fisheries that the goals and policies of the *Strategic Regional Policy Plan for South Florida* seek to protect.
- The goals and policies of the *Strategic Regional Policy Plan for South Florida*, in particular those indicated below, should be observed when making decisions regarding this project.

Strategic Regional Goal

- 3.1 Eliminate the inappropriate uses of land by improving the land use designations and utilize land acquisition where necessary so that the quality and connectedness of Natural Resources of Regional Significance and suitable high quality natural areas is improved.

Regional Policies

- 3.1.1 Natural Resources of Regional Significance and other suitable natural resources shall be preserved and protected. Mitigation for unavoidable impacts will be provided either on-site or in identified regional habitat mitigation areas with the goal of providing the highest level of resource value and function for the regional system. Endangered faunal species habitat and populations documented on-site shall be preserved on-site. Threatened faunal species and populations and species of special concern documented on-site, as well as critically imperiled, imperiled and rare plants shall be preserved on-site unless it is demonstrated that off-site mitigation will not adversely impact the viability or number of individuals of the species.
- 3.1.9 Degradation or destruction of Natural Resources of Regional Significance, including listed species and their habitats will occur as a result of a proposed project only if:
- a) the activity is necessary to prevent or eliminate a public hazard, and
 - b) the activity is in the public interest and no other alternative exists, and
 - c) the activity does not destroy significant natural habitat, or identified natural resource values, and
 - d) the activity does not destroy habitat for threatened or endangered species, and
 - e) the activity does not negatively impact listed species that have been documented to use or rely upon the site.
- 3.1.10 Proposed projects shall include buffer zones between development and existing Natural Resources of Regional Significance and other suitable natural resources. The buffer zones shall provide natural habitat values and functions that compliment Natural Resources of Regional Significance values so that the natural system values of the site are not negatively impacted by adjacent uses. The buffer zones shall be a minimum of 25 feet in width. Alternative widths may be proposed if it is demonstrated that the alternative furthers the viability of the Natural Resource of Regional Significance, effectively separating the development impacts from the natural resource or contributing to reduced fragmentation of identified Natural Resources of Regional Significance.

Strategic Regional Goal

- 3.4 Improve the protection of upland habitat areas and maximize the interrelationships between the wetland and upland components of the natural system.

Regional Policies

- 3.4.4 Require the use of ecological studies and site and species specific surveys in projects that may impact natural habitat areas to ensure that rare and state and federally listed plants and wildlife are identified with respect to temporal and spatial distribution.
- 3.4.5 Identify and protect the habitats of rare and state and federally listed species. For those rare and threatened species that have been scientifically demonstrated by past or site specific studies to be relocated successfully, without resulting in harm to the relocated or receiving populations, and where *in-situ* preservation is neither possible nor desirable from an ecological perspective, identify suitable receptor sites, guaranteed to be preserved and managed in perpetuity for the protection of the relocated species that will be utilized for the relocation of such rare or listed plants and animals made necessary by

unavoidable project impacts. Consistent use of the site by endangered species, or documented endangered species habitat on-site shall be preserved on-site.

- 3.4.8 Remove invasive exotics from all Natural Resources of Regional Significance and associated buffer areas. Require the continued regular and periodic maintenance of areas that have had invasive exotics removed.
- 3.4.9 Required maintenance shall insure that re-establishment of the invasive exotic does not occur.

Strategic Regional Goal

- 3.8 Enhance and preserve natural system values of South Florida's shorelines, estuaries, benthic communities, fisheries, and associated habitats, including but not limited to, Florida Bay, Biscayne Bay and the coral reef tract.

Regional Policies

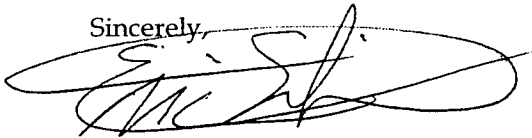
- 3.8.1 Enhance and preserve natural shoreline characteristics through requirements resulting from the review of proposed projects and in the implementation of ICE, including but not limited to, mangroves, beaches and dunes through prohibition of structural shoreline stabilization methods except to protect existing navigation channels, maintain reasonable riparian access, or allow an activity in the public interest as determined by applicable state and federal permitting criteria.
- 3.8.2 Enhance and preserve benthic communities, including but not limited to seagrass and shellfish beds, and coral habitats, by allowing only that dredge and fill activity, artificial shading of habitat areas, or destruction from boats that is the least amount practicable, and by encouraging permanent mooring facilities. Dredge and fill activities may occur on submerged lands in the Florida Keys only as permitted by the Monroe County Land Development Regulations. It must be demonstrated pursuant to the review of the proposed project features that the activities included in the proposed project do not cause permanent, adverse natural system impacts.
- 3.8.3 As a result of proposed project reviews, include conditions that result in a project that enhances and preserves marine and estuarine water quality by:
 - a) improving the timing and quality of freshwater inflows;
 - b) reducing turbidity, nutrient loading and bacterial loading from wastewater facilities and vessels;
 - c) reducing the number of improperly maintained stormwater systems; and
 - d) requiring port facilities and marinas to implement hazardous materials spill plans.
- 3.8.4 Enhance and preserve commercial and sports fisheries through monitoring, research, best management practices for fish harvesting and protection of nursery habitat and include the resulting information in educational programs throughout the region. Identified nursery habitat shall be protected through the inclusion of suitable habitat protective features including, but not limited to:

- a) avoidance of project impacts within habitat area;
- b) replacement of habitat area impacted by proposed project; or
- c) improvement of remaining habitat area within remainder of proposed project area.

3.8.5 Enhance and preserve habitat for endangered and threatened marine species by the preservation of identified endangered species habitat and populations. For threatened species or species of critical concern, on-site preservation will be required unless it is demonstrated that off-site mitigation will not adversely impact the viability or number of individuals of the species.

Thank you for the opportunity to comment. We would appreciate being kept informed on the progress of this project. Please do not hesitate to call if you have any questions or comments.

Sincerely,

A handwritten signature in black ink, appearing to read 'Eric Silva', enclosed within a large, loopy oval shape.

Eric Silva
Senior Planner

ES/ms

cc: Guillermo E. Olmedillo, Miami-Dade County
Jean Evoy, Miami-Dade County DERM
James C. Duck, USACE



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, FL 33702
(727) 570-5312, FAX 570-5517

MAR 13 2000

F/SER3:JBM

Mr. James C. Duck
Chief, Planning Division
Jacksonville District Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

Dear Mr. Duck:

This responds to your letter dated March 1, 2000 concerning the impacts to endangered and threatened species or their critical habitat as a result of the proposed renourishment at Haulover Beach Park, Dade County, Florida. To evaluate the environmental effects as a result of the proposed project, you have requested consultation pursuant to section 7 of the Endangered Species Act of 1973 (ESA), as amended.

We concur with your determination that this type of activity is covered under the biological opinion (BO) on hopper dredging along the Southeast Atlantic Coast, issued by the National Marine Fisheries Service (NMFS) in 1995, and amended on September 25, 1997. The BOs analyzed the effects of hopper dredging in channels and borrow areas and concluded that their use would not jeopardize the continued existence of species of sea turtles protected by the ESA. NMFS believes the regional BOs adequately address the work being proposed by this project.

This concludes consultation responsibilities under section 7 of the ESA. Consultation should be reinitiated if new information reveals impacts of the identified activity that may affect listed species or their critical habitat, a new species is listed, the identified activity is subsequently modified or critical habitat determined that may be affected by the identified activity.

If you have any questions or concerns, please contact Eric Hawk, fishery biologist, at the number listed above.

Sincerely,

for William T. Hogarth, Ph.D.
Regional Administrator

cc: F/PR2, F/SER4
1514-22 f.l.
O:\SECTION7\INFORMAL\HAULOVER.JAX





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

WATER MANAGEMENT DIVISION

SOUTH FLORIDA OFFICE

400 NORTH CONGRESS AVE., SUITE 120

WEST PALM BEACH, FLORIDA 33401

March 2, 2000

Mr. James C. Duck
Chief, Planning Division
U.S. Army Corps of Engineers
Planning Division
P.O. Box 4970
Jacksonville, FL 32232-0019

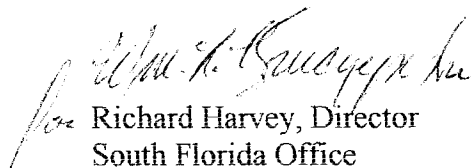
Dear Mr. Duck:

This is in response to your request for comments on a proposed project to renourish the Haulover Beach Park segment of the Dade County Beach Erosion Control and Hurricane Protection Project, Dade County, Florida. Our general concern with beach nourishment projects is that they are attempts to stabilize an inherently unstable coastal system. Also, destruction of the primary dune system by development, construction of jetties and seawalls, and construction and maintenance of inlets have upset the dynamic balance of coastal sediments. It is our opinion that the remediation of causes of the disruption to natural movements of coastal sediments should be addressed and compared to the perceived need to "hurricane proof" a shoreline through a massive dredging and disposal project.

Your letter provides a general discussion of the proposal project and alternatives. It is our understanding that greater detail of the project will be presented in the forthcoming Environmental Assessment (EA). We will evaluate the EA for conformance with the Section 404(b)(1) Guidelines which include avoidance and minimization of impacts to aquatic resources, and compensation for unavoidable losses. We recommend that the EA thoroughly address the need for this project, and include a detailed analysis of alternatives and the impacts of the project on aquatic resources at the borrow site and disposal site.

Thank you for the opportunity to provide these preliminary comments on the proposed project. If you have any questions, please contact Bill Kruczynski, of my staff, at (305) 743-0537.

Sincerely,


Richard Harvey, Director
South Florida Office



ReefKeeper[®] International

PHONE **FAX**
(305)358-4600 (305)358-3030

E-MAIL
reefkeeper@reefkeeper.org

WEB SITE
<http://www.reefkeeper.org>

OPERATIONS CENTER
PMB 162
2809 Bird Avenue
Miami, FL 33133

**LATIN AMERICA &
CARIBBEAN REGION**
PMB 321
703 Belt Road, Ramey
Aguadilla, PR 00603-1333

March 2, 2000
Operations Center

James C. Duck
Chief, Planning Division
Jacksonville District Corps
Of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019

RE: Renourishment at Haulover
Beach Park

Dear Mr. Duck:

In response to the public notice of the preparation of an Environmental Assessment (EA) for the renourishment of Haulover Beach Park as part of the Dade County Beach Erosion Control and Hurricane Protection Project, ReefKeeper International requests that the Environmental Assessment (EA) for this project include an evaluation of the following issues:

- locations of coral reefs and hardbottom communities;
- dredging buffer zones;
- risks during night dredging;
- use of reef protection areas;
- best pipeline placement;
- shape of borrow area;
- coral reef specific water quality requirements;
- use of turbidity barriers and turbidity buffer zones;
- sand quality and fines content;
- use of upland sand sources;
- use of inlet sand source;
- monitoring requirements;
- mitigation requirements; and
- reduction in scope of project.

ReefKeeper International, founded in 1989, is a non-profit organization dedicated to the protection of coral reefs and their marine life.

Survey Required – Coral Reefs and Hardbottoms Present

The seafloor near the proposed borrow areas and adjacent to the beach to be renourished contains significant coral reefs and hardbottom communities. Corals can grow as slowly as 1/5 to 1 millimeter per year (McConnaughey, 1983), with a knee-high coral head possibly being hundreds of years old. These characteristically slow growth rates simply mean that scleractinian reef-building corals are not a renewable resource on a biological time scale but rather should be viewed on a geological time scale.

Therefore, corals should not be put at risk of destruction from dredging and beach renourishment activities. ReefKeeper International requests that mapping of all coral reefs and hardbottom areas near the proposed project area be conducted to determine the location and extent of these important features. This mapping should adequately characterize and quantify the bottom cover in the specific locations.

Use of Dredging Buffer Zones

Past experience shows that physical dredging damage does occur during beach renourishments. In fact, coral reefs are most damaged by dredging. Poorly planned and implemented dredging operations have caused the demise of many reefs. Straughan (1972) condemned dredging for the destruction of some Florida Keys reefs. Poor planning at a beach renourishment dredging project off Hallandale, Florida resulted in reef burial.

Blair and Flynn (1988) documented the destruction by direct dredge impact of 2 acres of coral reef at a previous beach renourishment project in the Sunny Isles area. In 1988, two acres of natural coral reef were damaged or destroyed by a dredge during the rebuilding of Miami's Sunny Isles Beach. The damage was depicted as some of the most severe reef destruction in modern South Florida history, according to Carlos Espinosa, then Chief of the Water Management Division of the county's Department of Environmental Resources Management.

The dredging company had orders to draw sand from a strip of sea bottom between two reefs parallel to shore. Round the clock, seven days a week, a huge ship floated along the narrow corridor, sucking up sand.

Even though the dredging zone was established with dredging barge paths no closer than 200 feet to the nearest coral areas, this did not prevent the damage. The dredge strayed off its charted course and plowed as much as 150 feet into coral habitat without the dredge operators' knowledge of it. The dredge was pulled over the reef numerous times, in a path of destruction in some places 350 feet wide (Blair and Flynn, 1988). Even when chunks of broken coral began spewing out of the dredge suction pipe, the barge operators assumed it was relic material buried under the sand pocket they were working.

Errors and accidents do occur. They have in the past. And they will happen again if proper safeguards are not in place. Therefore, ReefKeeper International requests that the EA include an evaluation of adequate and precautionary dredging buffer zones around coral ecosystems.

Risks of Impact Due to Night Dredging Operations

For economic and time constraint reasons, dredging is often conducted around the clock for beach renourishment projects. Past projects have utilized lighted buoys that are often placed along the hardbottom areas to mark a dredge's path. However, these lighted buoys do not prevent the dredge from entering the coral areas or from damaging them. The lighted buoys give only a visual demarcation of the hardbottom.

ReefKeeper International requests that the EA assess the probability that the dredge will pass through a buoy line or other dredge path markers during nighttime dredging

operations and quantify the damage that would occur. If the dredge were to stray from its path, it would inevitably damage the surrounding coral communities before being able to turn.

ReefKeeper International further requests that the EA consider the risks of night dredging and the advantages of prohibiting this activity. The EA should quantify the probability of impact to the reefs as well as the probability of damage from nighttime dredging as opposed to daytime dredging.

Reef Protection Zones Should be Considered

Dredging is not the only activity conducted during beach renourishments that has the potential to adversely impact coral reefs and hardbottom communities. Construction vessels can run aground or scrape corals as they maneuver to, from, and around the dredge site. Heavy anchors can destroy corals on which they land.

Therefore, ReefKeeper International requests that the EA consider the implementation of "reef protection zones" so that reefs and hardbottom habitats are further protected from non-dredging activities such as construction vessel movement, anchoring, and spudding. All of these non-dredging activities should be prohibited in reef protection zones to protect these fragile resources.

Potential Habitat Destruction Due to Pipeline Placement

The presence of the pipeline used to move the sand on top of corals can damage, if not kill, these fragile marine organisms. Direct physical placement can crush corals and other reef organisms. The continued presence of the pipeline will shade corals, which are dependent upon sunlight for their survival.

ReefKeeper International requests that the EA include an evaluation of the potential adverse impacts by the pipeline used to move the sand. Quantification and a quality evaluation of any hardbottom habitat that would be covered should be included. If at all physically possible, damage should be avoided by routing the pipeline around corals -- or by using sand from a different source.

Risks Due to Shape of Borrow Site

Designs necessitating sharp turns within the borrow area may cause the dredge to stray from its path and onto the coral reefs and hardbottoms. The feasibility of the dredge being able to move out of the borrow area before turning to start a new dredge pass so it can make its re-entry turns in a wider, safer area should be fully investigated.

ReefKeeper International requests that the EA include an evaluation of the risks associated with the shape of the proposed borrow areas. If possible, the shapes should be rectangular with adequate area at each end of the borrow area to allow for maneuvering of the dredge vessel.

Coral-Specific Water Quality Requirements

Hard corals, in particular, are susceptible to the effects of elevated levels of turbidity due to dredging (Dodge et al., 1974; Loya, 1976; Dodge and Vaisnys, 1977; Bak, 1978;

Lasker, 1980; Marszalek, 1981; Rogers, 1983). High turbidity resulting from fine suspended particles generated by dredging decreases the amount of light -- a vital source of energy -- available to corals for the photosynthetic fixation of calcium carbonate (Johannes, 1975), thus reducing coral calcification (growth) rates (Lasker, 1980).

Turbidity also clogs the filter feeding mechanisms of coral polyps and causes continual energy losses by the necessity of continuous shedding of the protective mucus layer secreted by coral polyps (Lasker, 1980; Dallmayer et al., 1982).

Silt created by dredging remains in the local area for long periods and is resuspended during storms. Natural resuspension can also be compounded by the presence of silt fill discharged at the dredge site.

Moreover, sediments excavated by dredging are often anaerobic and bind up available dissolved oxygen. This forces reef organisms to increase respiration to remove silt, further lowering dissolved oxygen levels. Coupled with this increased respiration is reduced photosynthesis and oxygen production due to lowered light levels.

The usual result of chronic sedimentation is stressed corals susceptible to disease. The quantity of turbidity and the length of time required for exertion of its maximum stress effect is not known, but corals that are stressed expel essential symbiotic zooxanthellae and take on a pallid appearance prior to mortality (Goreau, 1964; Rogers, 1979; Glynn et al., 1984). Generally, mortality ensues within six weeks of such reactions.

Therefore, ReefKeeper International requests that the EA incorporate criteria specifically responsive to coral reef water quality requirements. Consideration of water quality requirements for corals will help prevent "unforeseen" negative impacts and will allow for the establishment of water quality criteria that are appropriate for the ecosystem.

Turbidity Buffer Zones and Turbidity Barriers

Poor planning at a beach renourishment dredging project off Hallandale, Florida resulted in reef burial and water quality problems (Courtenay et al. 1974). The 1990 beach renourishment project at Bal Harbour resulted in catastrophic sedimentation burial of coral reef areas near the dredging site (Blair et al., 1990). Similar destruction may occur at the proposed dredging site.

Given the history of adverse turbidity impacts during dredging projects and the severe damage to corals that results from poor water quality, ReefKeeper International requests that the EA evaluate the use of turbidity buffer zones and turbidity barriers. These measures should be incorporated into the project to minimize and monitor turbidity loads over the coral reefs adjacent to the dredging site, and to prevent fatal turbidity impacts to those coral reefs. Researchers have recommended buffer zones of up to half-a-nautical-mile to protect coral reefs from dredging siltation (Griffin 1974; Courtenay et al. 1974).

Adequate Determination of Sand Quality

The presence of too much fine-grained sand and silt in the borrow areas can have devastating effects on corals. During the dredging operation, this material will become

suspended in the water column, creating unacceptable turbidity levels. Once on this beach, these "fines" will be easily washed away and redeposit on the coral reefs and hardbottom communities.

Therefore, ReefKeeper International requests that the EA include sufficient testing of the borrow sand to ensure that the sand does not contain too much "fines". Representative testing in a number of locations and depths within the borrow areas should be conducted.

Availability of Upland Sand Sources for this Project

Upland sources of sand in Florida can provide medium to fine grained quartz sand. Upland sources have the benefits of not requiring the separation and disposal of larger-sized particles, reducing overfill and improving turbidity conditions at the deposition site due to its lower silt content, eliminating any environmental risks and impacts to offshore coral reef areas from dredging, and eliminating the need to mitigate.

ReefKeeper International requests that the EA fully evaluate the availability and economic feasibility of sand from upland sources. There must be a full presentation, comparative analysis and accounting that equitably compares the use of these upland sand sources with the use of the high-risk offshore borrow areas. Such a comparison must clearly show and take into account all the operational savings attributable to the use of the upland sand source -- such as no mitigation cost and no offshore rock disposal cost -- as well as the added values accruing from higher quality sand, eliminated risks to reefs, and more.

Potential Use of Inlet Sand to Supplement Renourishment

The proposed project location is near the Bakers Haulover Inlet. Inlets of this type often require periodic maintenance dredging to maintain depths necessary for navigation. Since these inlets are sand depositional environments and are often subjected to high water movement and dredging activities, they are generally not dominated by hardbottom communities. Currently, sand removed during maintenance dredging is usually dumped offshore.

ReefKeeper International requests that the EA include an evaluation of the potential of using maintenance dredged sand to supplement the proposed beach renourishment. Although there may be insufficient quantities to complete the entire project, the use of inlet sand may greatly reduce the size of the borrow areas required for this project.

Monitoring Requirements Must be Evaluated

Damage to coral reefs and hardbottom communities can only be detected if an adequate monitoring program is in place. Monitoring must be conducted before any dredging activities are initiated to determine the "baseline" conditions. Monitoring during the dredging is critical to identifying problems and preventing additional damage. Monitoring after the dredging is complete is important in determining long-term impacts of the project.

ReefKeeper International requests that the EA evaluate monitoring requirements for the coral reefs and hardbottom communities. Monitoring should be conducted before, during, and after the project to adequately determine the impacts.

Determination of Mitigation Requirements

One cannot assume that any dredging project will be conducted perfectly as planned and without a hitch. It is likely that the current nearshore area contains corals that will be covered during the renourishment activities. It is also likely that some corals will be adversely impacted during the dredging.

Therefore, ReefKeeper International requests that an adequate evaluation of possible mitigation measures to compensate for errors, unforeseen circumstances, and lost habitat be included in the EA prior to the initiation of the project. ReefKeeper International requests that this include an evaluation of the feasibility of relocating all coral colonies that may be covered by the pipeline or are within buffer zone areas. To mitigate for stony coral mortality from coral relocation, and for general destruction of benthic biota, any proposed concrete and limestone modules should be deployed on more than a 1-to-1 basis at locations where the deployment would provide new hard substrate for the settlement of new corals and other benthic organisms.

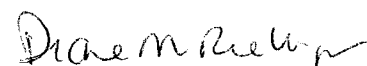
Potential Reduction in Scope of Project

The project as proposed calls for the placement of 114,000 cubic yards of material at Haulover Beach Park, extending the beach hundreds of feet into the ocean. The vast extent of the renourishment from the current shoreline only increases the adverse impacts to marine life from this project.

Therefore, ReefKeeper International requests that the EA include an evaluation of a potential reduction in the size of the project. A project smaller in width may necessitate more frequent renourishing and the potential costs and benefits of this should be examined. The potential use of sand dredged from nearby inlets may make smaller, more frequent renourishment activities both economically and environmentally more viable than the current proposed project.

Thank you very much for your consideration, and anticipated support, of our requests for the inclusion in the Environmental Assessment of measures to protect the fragile coral reefs and hardbottom communities of Miami-Dade County, Florida.

Sincerely,



Diane M. Rielinger
Senior Policy Associate
ReefKeeper International

References

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- Blair S. and B. Flynn. 1988. Sunny Isles Beach Restoration Project: Mechanical Damage to the Reefs Adjacent to the Borrow Area. Metro-Dade DERM Technical Report 88-14. 17pp.
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Planning Division
Environmental Branch

MAR 01 2000

Mr. Charles Oravetz
Chief, Protected Species Management Branch
National Marine Fisheries Service
9721 Executive Center Drive, North
St. Petersburg, Florida 33702

Dear Mr. Oravetz:

This is in reference to the Dade County Beach Erosion Control and Hurricane Protection Project and the proposed renourishment at Haulover Beach Park. For a description of the proposed action, please refer to the enclosed public notice dated February 3, 2000. Also reference the Regional Biological Opinion (RBO) on hopper dredging along the Southeast Atlantic Coast as amended on September 25, 1997.

The U.S. Army Corps of Engineers has determined that the proposed renourishment activities are covered by the referenced RBO and no further consultation with the National Marine Fisheries Service under Section 7 of the Endangered Species Act is required at this time. Your concurrence on this determination is requested.

If you have any questions or need any additional information, please contact Mr. Mike Dupes at 904-232-1689.

Sincerely,

James C. Duck
Chief, Planning Division

Enclosure

bcc:
CESAJ-DP-I (Stevens)

February 29, 2000

Mr. James Duck, Chief
Planning Division
Department of the Army
Jacksonville District
Corps of Engineers
P.O. Box 4970
Jacksonville, FL 32232-0019



**SUBJECT: Renourishment At Haulover Beach Park, a Miami-Dade County Beach Erosion Control
And Hurricane Protection Project**

REFERENCE: REQUEST FOR A PUBLIC HEARING

attachments: PETITIONS FOR BEACH RENOURISHMENT (89 pages, 442 Signatures)

Dear Mr. Duck:

Please accept this letter as our request for a public hearing. To conform with the criteria of the Army Corps of Engineers for a public hearing we submit the following *Evaluation Factors*. Please consider the following input on the need to renourish the beach at Haulover Beach Park as our reason for requesting a public hearing. Specifically, the northern end of the beach at Haulover Beach Park. Our association members and the general public have been using this beach in increasing numbers for the past 9 years. We have witnessed the gradual erosion of the beach and estimate over 50 feet or more of beach has eroded during this time. This erosion has been caused by hurricanes, severe storms and other natural phenomenon including tides and nature's normal beach erosion.

This beach meets the criteria for calling a public hearing and for sand replenishment for the following reasons:

*** General Environmental Concerns.** The erosion over the past 10 years has endangered the protected sand dune and sea grape areas. It brings the ocean closer to *Evacuation Route A1A* and endangers the escape route during a storm of hurricane proportions. *If not renourished, it will endanger the planned renourishment of Sunny Isles Beach. Haulover, by having a shoreline over 100 feet west of the planned Sunny Isles Beach shoreline, would cause the rapid movement and erosion of the Sunny Isles Beach, by causing the sand to migrate south. This movement would jeopardize the integrity of the Sunny Isles Beach sand renourishment project on its most southern boundary thus voiding its intended purpose. This would have a domino effect on the whole of Sunny Isles Beachs'.*

mdcg82

**Naturist
Society**

Affiliated with The Naturist Society • Naturist Action Committee • Naturist Education Foundation

*** Fish and Wildlife Values.**

Haulover Beach Park is an important spawning ground for sea turtles and they must have an adequate size beach in which to lay their eggs.

*** Flood Hazards.**

The beach at its present size may not be able to prevent flood waters created by ocean storms from washing over "Evacuation Route" A1A.

*** Land Use.**

Haulover Beach Park is a major regional park within the park system of Miami-Dade County and is one of the few oceanfront parks left in Miami-Dade County. With the build out of all the land north and south of Haulover Beach Park, this is the last remaining beach/park area available to the public. Its current land use should be protected by beach renourishment and preserved.

*** Shoreline Erosion and Accretion.**

The shoreline has had substantial erosion. Sand renourishment is needed to restore the shoreline so that it will be on an equal distance from the county's landside survey line which runs from the south end of Miami Beach Government Cut to the north boundary of Sunny Isles Beach. This renourishment is needed to protect the integrity of all the other beach renourishment projects on this shoreline.

*** Recreation.**

The northern 1/4 mile of Haulover Beach Park now sees over 1.1 million visitors a year. It is the most popular recreational beach in Miami Dade County. The beach renourishment is needed to enable the beach visitors to have sufficient room to recreate in less crowded conditions. Many of these visitors are tourists from out side of Miami-Dade County. "Wider is Better."

*** Economics.**

The economic benefits of beach renourishment to Miami-Dade County, Broward County, South Florida, Florida and the United States can best be verified by a survey of the people using Haulover Beach Park. There are many tourists from all over the world and they purchase local condos, rent local apartments seasonally, stay at area hotels, eat at area restaurants and shop here. Their contributions are, they pay taxes, create jobs and are a return on the investment of local, state and United States dollars spent to attract tourists to the area.

*** Safety.**

The renourishment of Haulover Beach will contribute to the safety of the area. A wider beach is a safer beach. The protection of "Evacuation Route" A1A is of paramount importance. This route is important to the residence of Bal Harbour and Sunny Isles as an escape route in an mandatory evacuation.

Mr. Duck
Army Corps
2/29/00
page 3

*** Property Ownership.**

The beach sand renourishment project is important to protect the property of Miami-Dade County. The buildings at Haulover Beach include a main LifeGuard Station with police radio access and 30 lifeguard towers, a Miami-Dade County Police sub-station, and a Miami-Dade County Fire Rescue. The Fire Rescue unit is the one that the residents of Bal Harbour, Surfside, and Sunny Isles Beach must rely on, for both primary and back-up fire rescue service.

As you can see by the previously stated facts, the sand renourishment of Haulover Beach Park is an important project for metropolitan Miami-Dade County. It is not an isolated project, but a link in the chain of all the other beach renourishment projects the Army Corps of Engineers has completed and have planned on the coastline of Miami-Dade County.

We believe that the renourishment of Haulover Beach Park is important to the integrity of the Sunny Isles Beach renourishment project as well. After careful review, we believe the Army Corps of Engineers will agree with our assessment and will further see that the needs of Haulover Beach Park meet your criteria for beach renourishment.

Attached, please find 89 Petition sheets containing over 440 signatures requesting the renourishment of Haulover Beach Park.

We therefore respectfully request that you move forward on the process of renourishing Haulover Beach Park by preparing an Environmental Assessment (EA) and calling for a public hearing on the matter.

We further request the extension of the input period. We did not receive your notice, which is dated February 3, 2000 until February 14th and believe in fairness, the period for input should be opened for an additional two week period.

Please advise of your decision. We thank you in advance for your considerations and efforts of behalf of the citizens of Miami-Dade County and the users of Haulover Beach Park.

Sincerely,



Richard Mason, Director
Chair, Community Relations and
Government Affairs
South Florida Free Beaches., Inc.
Florida Naturist Association

attachments

mdcg84

**Naturist
Society**

Affiliated with The Naturist Society • Naturist Action Committee • Naturist Education Foundation

Planning Division
Environmental Branch

FEB 29 2000

Mr. James J. Slack
U.S. Fish and Wildlife Service
South Florida Ecosystems Office
Post Office Box 2676
Vero Beach, Florida 32961-2676

Dear Mr. Slack:

This is in reference to the Dade County Beach Erosion Control and Hurricane Protection Project and the proposed renourishment at Haulover Beach Park. The project is described in a public notice dated February 3, 2000, which was previously sent to your office.

The Biological Opinion (BO) dated October 24, 1996, for Region III of the Coast of Florida Erosion and Storm Effects Study includes the project area considered for the Haulover Beach Park renourishment. We believe the reasonable and prudent measures, and terms and conditions listed in the BO for Dade County apply to the proposed renourishment. We plan to incorporate these requirements into the project plans and specifications, and any contracts as appropriate.

Your written concurrence on this determination is requested. If you have any questions or need further information, please contact Mr. Mike Dupes of my staff at 904-232-1689.

Sincerely,

James C. Duck
Chief, Planning Division

CF: Mr. Chuck Sultzman, U.S. Fish and Wildlife Service, Post Office Box 2676,
Vero Beach, Florida 32961-2676

bcc:
CESAJ-DP-I (Stevens)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southeast Regional Office
9721 Executive Center Drive North
St. Petersburg, Florida 33702

February 28, 2000

Mr. James C. Duck
Chief, Planning Division
Department of the Army, Corps of Engineers
Planning Division, Environmental Branch
P.O. Box 4970
Jacksonville, Florida 32232-0019

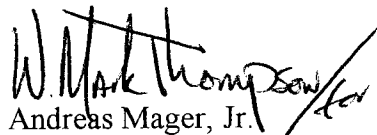
Dear Colonel Miller:

The National Marine Fisheries Service (NMFS) has reviewed the public notice dated February 3, 2000, requesting comments for the proposed renourishment of the Haulover Beach Park segment of the Dade County Beach Erosion Control and Hurricane Protection Project on the Atlantic Ocean, Dade County, Florida.

The information supplied in the letter generally outlines the Proposed Action for the project and location, as well as several alternatives. However, detailed information concerning the impacts to aquatic resources and measures of avoidance and minimization for the Proposed Action and each alternative was not provided. Therefore, we have no specific comment to provide at this time. The NMFS will be available to review the Environmental Assessment for the project when it is completed.

Thank you for your consideration of our comments. If you have questions, please contact Michael Johnson in Miami, Florida at 305/595-8352.

Sincerely,



Andreas Mager, Jr.
Assistant Regional Administrator
Habitat Conservation Division

cc:
EPA,WPB
DEP,WPB
FFWCC,TALL
FWS,VERO
F/SER4
F/SER43-JOHNSON



DIVISIONS OF FLORIDA DEPARTMENT OF STATE

Office of the Secretary
Office of International Relations
Division of Elections
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Division of Cultural Affairs
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Department of Veterans' Affairs

FLORIDA DEPARTMENT OF STATE

Katherine Harris

Secretary of State

DIVISION OF HISTORICAL RESOURCES

Mr. James C. Duck
Planning Division, Environmental Branch
Jacksonville District, Corps of Engineers
P.O. Box 4970
Jacksonville, Florida 32232-0019

February 8, 2000

RE: DHR Project File No. 2000-01055
Cultural Resource Assessment Request
Renourishment at Haulover Beach Park Dade County Beach Erosion Control
and Hurricane Protection Project
Dade County, Florida

Dear Mr. Duck:

In accordance with the procedures contained in 36 C.F.R., Part 800 ("Protection of Historic Properties"), we have reviewed the referenced project for possible impact to historic properties listed, or eligible for listing, in the *National Register of Historic Places*. The authority for this procedure is the National Historic Preservation Act of 1966 (Public Law 89-665), as amended.

We have reviewed of the Florida Master Site File and our records and no historic properties are known to exist in the area of potential effect. Therefore, based on the information provided, it is the opinion of this office that no historic properties will be affected by this undertaking.

If you have any questions concerning our comments, please contact Scott Edwards, Historic Preservation Planner, at 850-487-2333 or 800-847-7278. Your interest in protecting Florida's historic properties is appreciated.

Sincerely,

Janet Snyder Matthews, Ph.D., Director
Division of Historical Resources
State Historic Preservation Officer

JSM/Ese

R.A. Gray Building • 500 South Bronough Street • Tallahassee, Florida 32399-0250 • <http://www.flheritage.com>

<input type="checkbox"/> Director's Office (850) 488-1480 • FAX: 488-3355	<input type="checkbox"/> Archaeological Research (850) 487-2299 • FAX: 414-2207	<input checked="" type="checkbox"/> Historic Preservation (850) 487-2333 • FAX: 922-0496	<input type="checkbox"/> Historical Museums (850) 488-1484 • FAX: 921-2503
<input type="checkbox"/> Historic Pensacola Preservation Board (850) 595-5985 • FAX: 595-5989	<input type="checkbox"/> Palm Beach Regional Office (561) 279-1475 • FAX: 279-1476	<input type="checkbox"/> St. Augustine Regional Office (904) 825-5045 • FAX: 825-5044	<input type="checkbox"/> Tampa Regional Office (813) 272-3843 • FAX: 272-2340



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

Planning Division
Environmental Branch

FEB 03 2000

PUBLIC NOTICE

RENOURISHMENT AT HAULOVER BEACH PARK DADE COUNTY BEACH EROSION CONTROL AND HURRICANE PROTECTION PROJECT

TO ADDRESSEES ON THE ENCLOSED LIST:

The Jacksonville District, U.S. Army Corps of Engineers is providing the enclosed public notice concerning the renourishment of the Haulover Beach Park segment of the Dade County Beach Erosion Control and Hurricane Protection Project.

We welcome your views, comments and information about the project. Your input should be provided as indicated in the enclosed public notice.

Sincerely,

A handwritten signature in cursive script, reading "James C. Duck", is positioned above the typed name.

James C. Duck
Chief, Planning Division

Enclosure

LIST OF ADDRESSES FOR PUBLIC NOTICE

(33 CFR 325.3(d) & 337.1(c))

(Detailed List in Project Records)

- 1) distribution for posting in post offices or other appropriate public places in the vicinity of the site of the proposed work,
- 2) appropriate city and county officials,
- 3) adjoining property owners,
- 4) appropriate state agencies,
- 5) appropriate Indian Tribes or tribal representatives,
- 6) concerned Federal agencies,
- 7) local, regional and national shipping and other concerned business and conservation organizations,
- 8) appropriate River Basin Commissions,
- 9) appropriate state and areawide clearing houses as prescribed by OMB Circular A-95,
- 10) local news media,
- 11) any other interested party,
- 12) all parties who have specifically requested copies of public notices,
- 13) the U.S. Senators and Representatives for the area where the work is to be performed,
- 14) the field representative of the Secretary of the Interior,
- 15) the Regional Director of the Fish and Wildlife Service,
- 16) the Regional Director of the National Park Service,
- 17) the Regional Administrator of the Environmental Protection Agency,
- 18) the Regional Director of the National Marine Fisheries Service,
- 19) the head of the state agency responsible for fish and wildlife resources,
- 20) the State Historic Preservation Officer
- 21) the District Commander, U.S. Coast Guard

PUBLIC NOTICE
RENOURISHMENT OF THE HAULOVER BEACH PARK SEGMENT
DADE COUNTY BEACH EROSION CONTROL AND
HURRICANE PROTECTION PROJECT

PUBLIC NOTICE AUTHORITY:

Section 404 of the Clean Water Act (33 U.S.C. 1344). This public notice is being issued in accordance with Corps of Engineers Regulations concerning Civil Works Projects (part 7-64 b of ER 1105-2-100). This notice complies with Corps policy concerning public notice of Civil Works projects relative to Section 404 of the Clean Water Act.

Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 as Amended (33 U.S.C. 1314). This notice will also satisfy any public notice requirements relative to Section 103 of this act as it may apply to this project (part 7-69 of ER 1105-2-100).

POINT OF CONTACT FOR ADDITIONAL INFORMATION: Submit comments to Mr. James C. Duck, Chief, Planning Division, Jacksonville District Corps of Engineers, P.O. Box 4970, Jacksonville, Florida, 32232-0019, fax (904) 232-3442. For additional information, contact Mr. Mike Dupes at (904) 232-1689 or at the fax number above.

PROJECT AUTHORITY:

Initial Authorization. The Beach Erosion Control and Hurricane Protection (BEC & HP) Project for Dade County, Florida was authorized by the Flood Control Act of 1968 (see figure 1, location map). In addition, Section 69 of the 1974 Water Resources Act (P.L. 93-251 dated 7 March 1974) included the initial construction by non-Federal interests of the 0.85-mile segment along Bal Harbour Village, immediately south of Baker's Haulover Inlet. The authorized project, as described in HD 335/90/2, provided for the construction of a protective/recreational beach and a protective dune for 9.3 miles of shoreline between Government Cut and

Baker's Haulover Inlet (encompassing Miami Beach, Surfside and Bal Harbour) and for the construction of a protective/recreational beach along the 1.2 miles of shoreline at Haulover Beach Park.

Supplemental Appropriation. The Supplemental Appropriations Act of 1985 and the Water Resources Development Act of 1986 (Public Law 99-662) provided authority for extending the northern limit of the authorized project to include the construction of a protective beach along the 2.5 mile reach of shoreline north of Haulover Beach Park (Sunny Isles) and for periodic nourishment of the new beach. This authority also provided for the extension of the period of Federal participation in the cost of nourishing the authorized 1968 BEC & HP Project for Dade County, which covered 10.5 miles of shoreline extending from Government Cut north to the northern boundary of Haulover Beach Park, from 10 years to the 50-year life of the project.

Project Purpose. The purpose of the project is to prevent or reduce loss of public beachfront to continuing erosional forces and to prevent or reduce periodic damages and potential risk to life, health, and property in the developed lands adjacent to the beach.

PROJECT DESCRIPTION AND LOCATION:

Proposed Action. The placement of about 114,000 cubic yards of material would be required along the beach at Haulover Beach Park, Dade County, Florida. The beach fill would extend southward from the border with Sunny Isles, approximately 2,600 feet. Refer to figure 2 for a plan view of the fill area. The construction berm width is 120 feet from the ECL at an elevation of +9 feet mean low water (mlw), with a construction tolerance of +/- 0.5 feet. The front slope of the fill will be 1 vertical

on 10 horizontal. Refer to figure 3 for a typical profile view.

Alternatives. Alternatives in addition to beach renourishment were considered in the 1975 GDM for the Dade County Beach Erosion Control and Hurricane Protection Project. The alternatives considered include a) implementing Hurricane warning and emergency flood mobilization; b) revising zoning regulations and existing building codes; c) raising existing bulkheads and seawalls; d) hurricane dunes; and e) groins. These alternatives are discussed below.

a) Implementing hurricane warning and emergency flood mobilization is unrealistic for overall protection because mass evacuation requires an adequate preplanned emergency mobilization plan. Forecasts of the exact path of hurricane approach cannot usually be made with any great degree of accuracy until a short time prior to the arrival of the storm.

b) "Hurricane proofing," where sufficient time exists before hurricane landfall, can reduce wind and rain damage but has no effect on tidal-flooding. Revised zoning regulations, more realistic bulkhead lines and minimum fill elevations would also have little effect on tidal flooding because of the advanced stage of development on the island.

c) Without an adequate beach, seawalls would have to be so massive that they would be objectionable to waterfront property owners.

d) Constructing a dune to a higher elevation would provide small additional benefits during a design hurricane occurrence in relation to the increase in costs.

e) Costs of groin construction would exceed the cost of periodic nourishment, would not increase benefits, and are not economically justified.

Borrow Site. The proposed borrow site is located within the ebb tidal shoal northeast of Bakers Haulover Inlet in 15 to 20 feet of water (figure 4). Field investigations of this area have previously been performed by the USFWS, DERM and the Corps in

association with a proposed renourishment at Bal Harbour. A State Water Quality Certification application for the use of this borrow area is currently under review by the Florida Department of Environmental Protection (DEP).

Alternative Borrow Sites. Alternate borrow sites considered include distant sources, deep water sources (60 to 300 feet deep), borrow areas located south of Government Cut and upland sources.

PROJECT SCHEDULE: The proposed action is planned to occur during the summer/fall of 2001.

DRAWINGS: Figure 1 is enclosed as a project location map; figure 2 is a plan view of the fill area; figure 3 shows a typical beach profile; figure 4 shows the borrow site at Bakers Haulover Inlet ebb shoal.

RELATIONSHIP TO BASELINE OF TERRITORIAL SEA: All activities proposed would occur within 3 miles of the Florida coastline. A major purpose of the project is to prevent or reduce loss of public beach front to continuing erosional forces.

OTHER GOVERNMENT AUTHORIZATIONS:

Water Quality Certification. The project would cause temporary increases in turbidity at dredging and beach disposal sites. The State of Florida water quality regulations require that water quality standards not be violated during dredging operations. The standards state that turbidity outside the mixing zone shall not exceed 29 NTU's above background. Various protective measures and monitoring programs would be conducted during construction to ensure meeting state water quality criteria. Should turbidity exceed State water quality standards as determined by monitoring, the contractor would be required to cease work until conditions returned to normal. The U.S. Army Corps of Engineers has submitted an application for Water Quality Certification (WQC) to the Florida Department of Environmental Protection for the project. Any comments concerning water quality aspects of the proposed action should also be directed to:

Florida Department of Environmental Protection
3900 Commonwealth Boulevard
Mail Stop 310
Tallahassee, Florida 32399-3000.

Compliance with Environmental Requirements. The following requirements have been or are being addressed for the project. Additional discussion is being included in the Environmental Assessment (see section below on NEPA documentation).

- 1) National Environmental Policy Act of 1969, as amended.
- 2) Endangered Species Act of 1973, as amended.
- 3) Fish and Wildlife Coordination Act of 1958, as amended.
- 4) National Historic Preservation Act of 1966, (PL 89-665) and the Archeology and Historic Preservation Act (PL 93-291).
- 5) Clean Water Act of 1972, as amended.
- 6) Clean Air Act of 1972, as amended.
- 7) Coastal Zone Management Act of 1972, as amended.
- 8) Farmland Protection Policy Act of 1981.
- 9) Wild and Scenic River Act of 1968, as amended.
- 10) Marine Mammal Protection Act of 1972, as amended.
- 11) Estuary Protection Act of 1968.
- 12) Federal Water Project Recreation Act, as amended.
- 13) Fishery Conservation and Management Act of 1976.
- 14) Submerged Lands Act of 1953.

15) Coastal Barrier Resources Act of 1972, as amended by the Coastal Barrier Improvement Act of 1990.

16) River and Harbor Act of 1899.

17) Anadromous Fish Conservation Act.

18) Migratory Bird Treaty Act and Migratory Bird Conservation Act.

19) Marine Protection, Research, and Sanctuaries Act of 1972.

20) Magnuson – Stevens Fishery Conservation and Management Act.

21) E.O. 11990, Protection of Wetlands.

22) E.O. 11988, Flood Plain Management.

23) E.O. 12898, Environmental Justice.

24) E.O. 13089, Coral Reef Protection.

NEPA DOCUMENTATION: An Environmental Assessment (EA) will be prepared for the proposed action. The final EA would consider any information received as a result of this public notice. See section below on "Other Available Information" for availability of EA/FONSI.

HISTORIC PROPERTIES: Cultural resource investigations have been conducted for the proposed project. Information resulting from those investigations, as well as evidence of coordination with the Florida State Historic Preservation Officer (SHPO), will be included in the EA.

ENDANGERED SPECIES:

Proposed Project. Consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service pursuant to the Endangered Species Act and the Fish and Wildlife Coordination Act is ongoing for the proposed action. We will consider the recommendations from the U. S. Fish and Wildlife Service and the National Marine Fisheries Service for purposes of compliance with the Federal Endangered Species Act. Impacts on the manatee,

sea turtles, sea turtle nesting, and other species will be addressed.

Other Sand Sources. The use of other sand sources (upland, deep water, or distant ocean bottoms) would require additional consultation.

EVALUATION FACTORS:

General. The decision whether to pursue the proposed work or some alternative will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit, which reasonably may be expected to accrue from the proposal, must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership and, in general, the needs and welfare of the people.

Application of Guidelines, Section 404(b)(1) of the Clean Water Act. The EA will contain a preliminary evaluation for compliance with the guidelines pursuant to Section 404(b)(1) of the Clean Water Act (part 230 of Title 40 of the Code of Federal Regulations). A final determination of compliance will include consideration of the information received as a result of this notice, any public hearing, and other sources.

Application of Criteria, Section 102(a) of the Marine Protection, Research and Sanctuaries Act of 1972. If determined appropriate, the project will be evaluated with respect to the criteria for ocean dumping pursuant to Section 102(a) of the act (part 220 to 229 of Title 40 of the Code of Federal Regulations).

OTHER AVAILABLE INFORMATION:

Following this notice, we will prepare an Environmental Assessment (EA), and, if appropriate, a Finding of No Significant Impact (FONSI). You may contact Mike Dupes at (904) 232-1689 concerning the availability of the EA. When completed, the EA (and FONSI, if appropriate) will be made available at the Miami Beach Branch Public Library, 2100 Collins Avenue, Miami Beach, Florida. The library hours are 10 a.m. to 8 p.m. on Monday and Wednesday and 10 a.m. to 5:30 p.m. on Tuesday, Thursday, and Saturday. The point of contact at the library is Gia Thompson at (305) 535-4219.

COMMENT PERIOD: Comments on this notice should be received within 30 days of the date of the notice. Comments should be addressed to the attention of Mr. James C. Duck, Chief, Planning Division at the above letterhead address.

PUBLIC HEARING: Any person may request, in writing, within the comment period specified above, that a public hearing be held to consider the proposed action. Requests for public hearings shall state, with particularity, the reasons for holding a public hearing.

CZM PLAN: Compliance would be achieved in combination with certification of water quality (see Other Governmental Authorizations above). The proposed activity will be undertaken in a manner consistent to the maximum extent practicable with the state coastal zone management program.

COORDINATION WITH FEDERAL, STATE, AND LOCAL ENVIRONMENTAL AGENCIES:

The following environmental agencies have been or will be consulted concerning the proposed project.

- 1) U.S. Fish and Wildlife Service
- 2) National Marine Fisheries Service
- 3) Florida Department of Environmental Protection
- 4) Florida Fish and Wildlife Conservation Commission
- 5) State Historic Preservation Officer
- 6) U.S. Environmental Protection Agency

LIST OF ENCLOSURES:

- 1) Figure 1, Location of proposed action.
- 2) Figure 2, Plan view of the beach fill area.
- 3) Figure 3, Typical beach profile.
- 4) Figure 4, Potential borrow site at Bakers
Haulover Inlet ebb shoal.

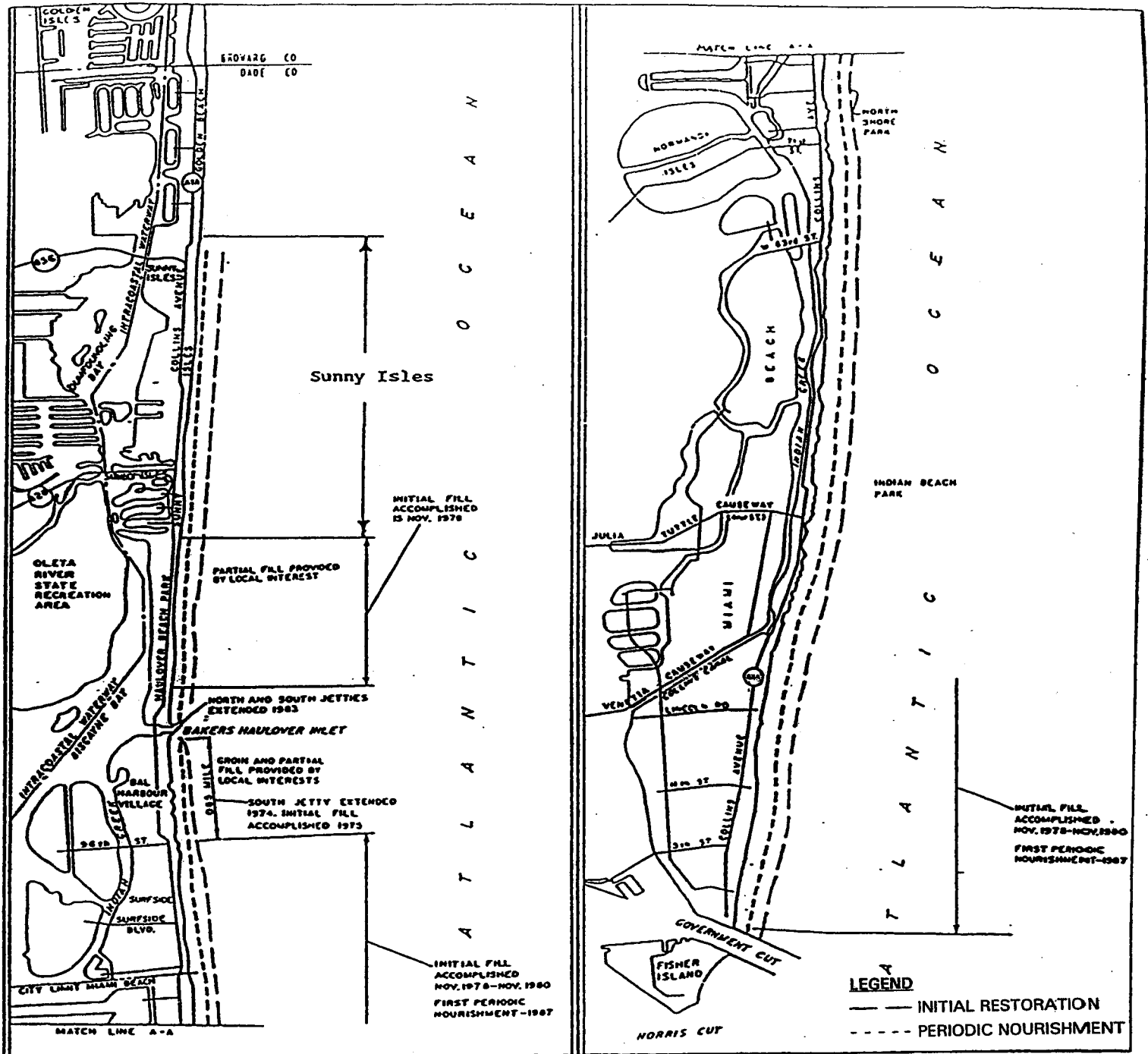
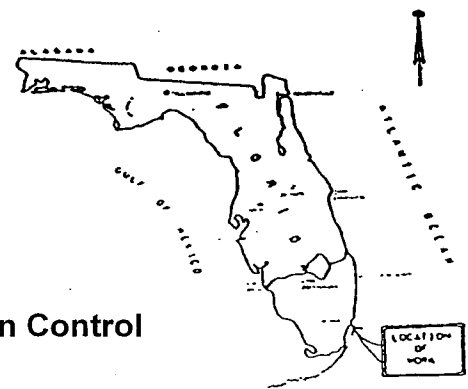
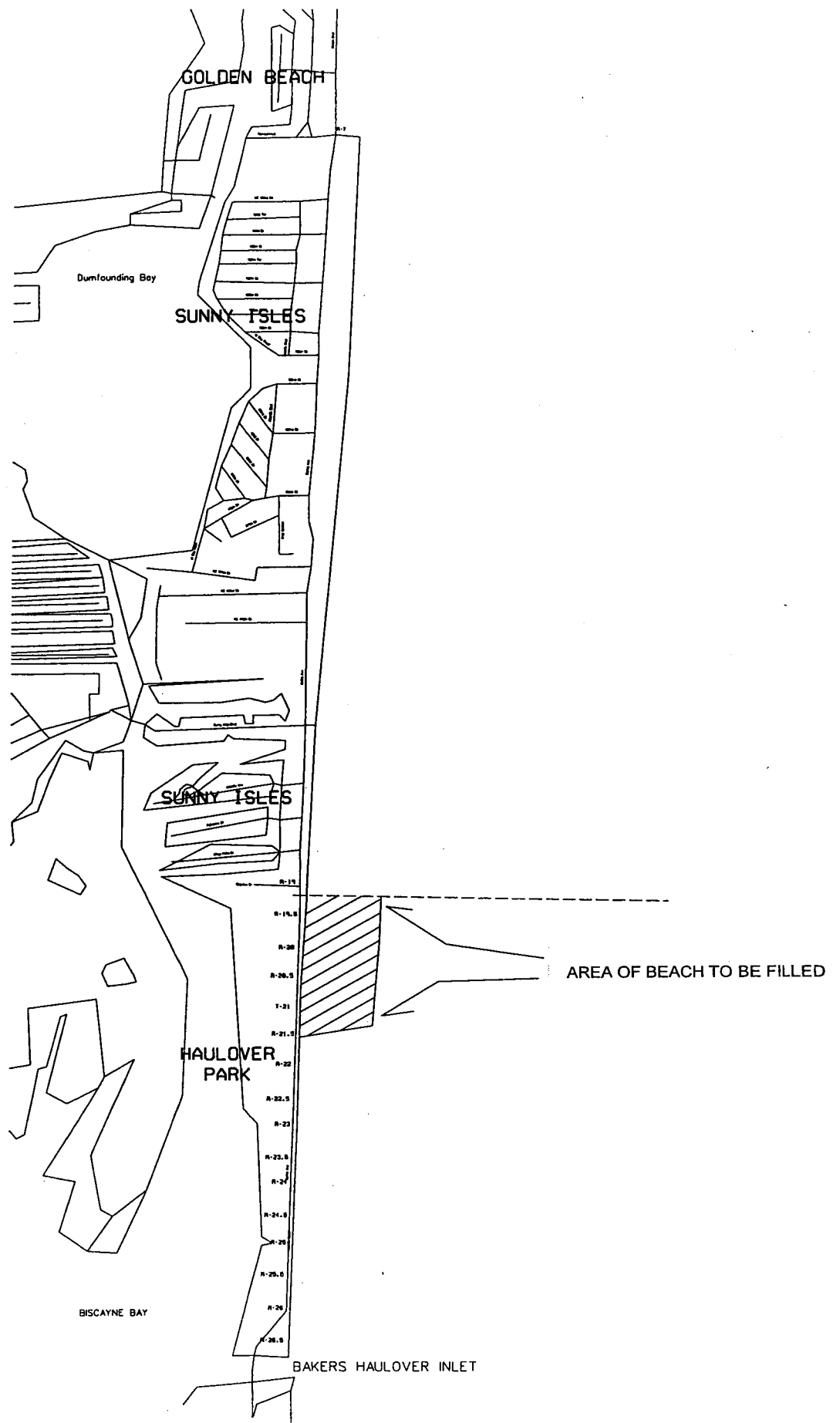


Figure 1. Location Map - Dade County Beach Erosion Control and Hurricane Protection Project.





PLAN VIEW OF FILL AREA
(NOT TO SCALE)

Figure 2



US ARMY CORPS
OF ENGINEERS
JACKSONVILLE DISTRICT

TYPICAL BEACH PROFILE

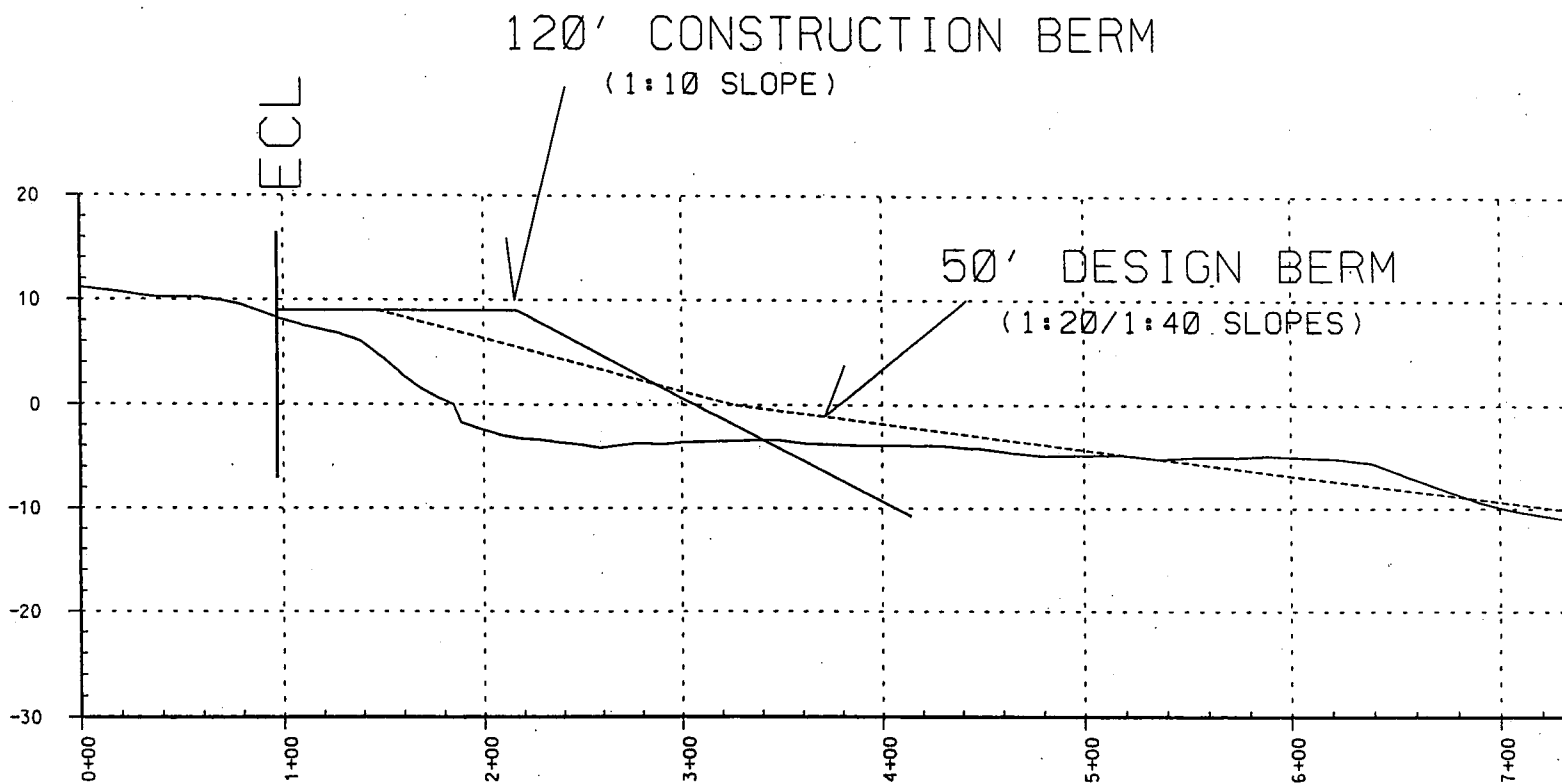
SHORE PROTECTION PROJECT
DADE COUNTY, FLORIDA
HAUOVER BEACH PARK SEGMENT

CESAJ-EN-DL

DATE:

SHEET NO.:

ELEVATION IN FEET - MEAN LOW WATER



R-19

Figure 3. Typical Beach Profile.

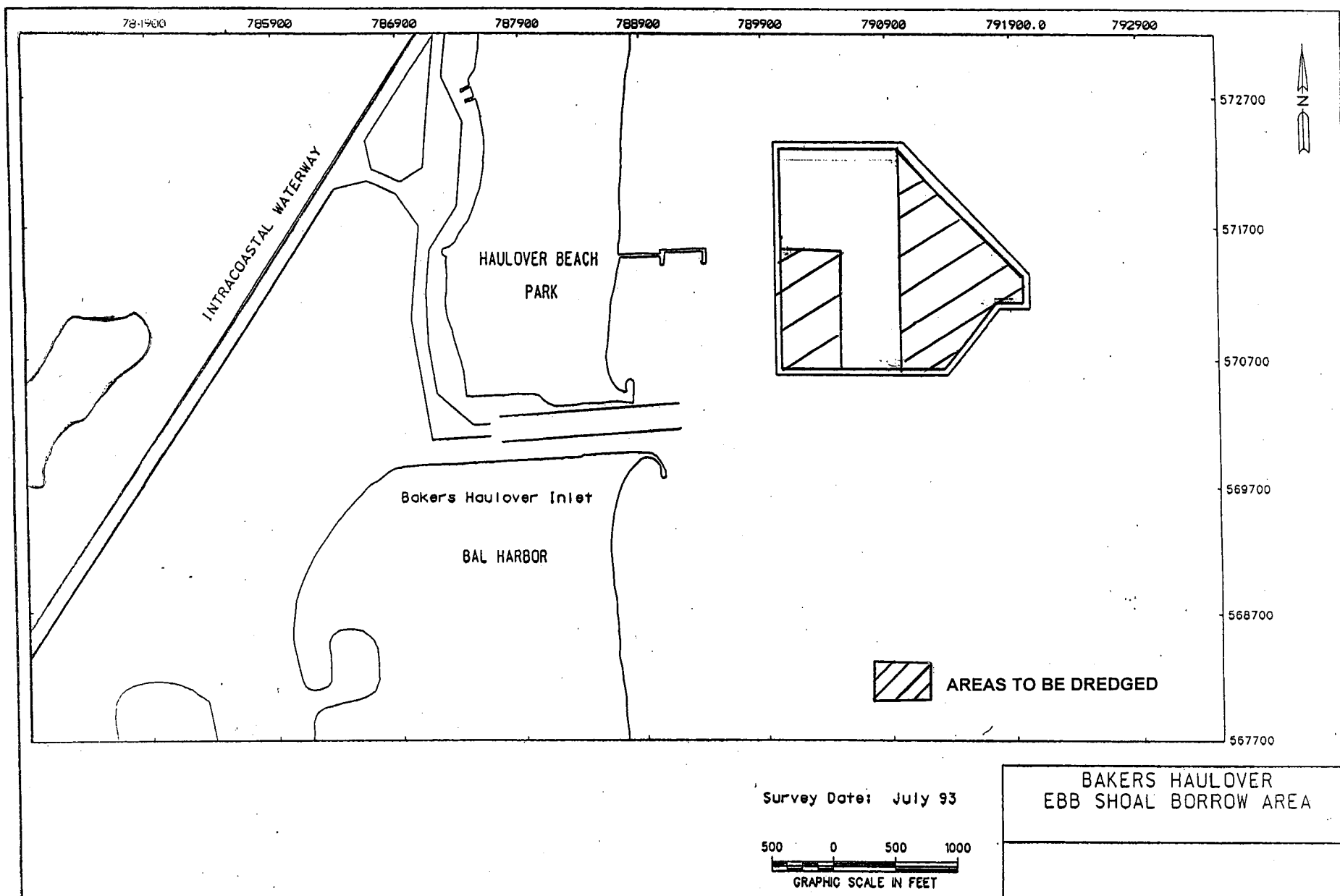


Figure 4. Potential borrow area at Baker's Haulover ebb shoal.

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(ATTN: JERRY OREN)
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BAL HARBOUR, FL 33154

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PETE SOLER, GENERAL MANAGER
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BAL HARBOUR, FL 33154

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BAL HARBOUR TOWER CONDOMINIUM
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THE TIFFANY OF BAL HARBOUR CONDO
GERALD ORANGE, GENERAL MANAGER
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BAL HARBOUR, FL 33154

PLAZA OF BAL HARBOUR CONDOMINIUM
ORLANDO VEGA, GENERAL MANAGER
10185 COLLINS AVE.
BAL HARBOUR, FL 33154

BAL HARBOUR CLUB INC.
10201 COLLINS AVE.
BAL HARBOUR, FL 33154

KENILWORTH CONDOMINIUM
ALAN SCHWEIGER, GENERAL MANAGER
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BAL HARBOUR, FL 33154

KENILWORTH HOUSE INC CO-OP
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CARLTON TERRACE CONDOMINIUM
TONY LACKNER, GENERAL MANAGER
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ELIZABETH MERRILL, GENERAL MANAGER
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DEBBIE SOBEL
GOLDEN BEACH TURTLE WATCH
172 GOLDEN BEACH DRIVE
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GOLDEN BEACH, FL 33160-2208

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GOLDEN BEACH, FL 33160-2209

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GOLDEN BEACH, FL 33160-2209

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GOLDEN BEACH, FL 33160-2209

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GOLDEN BEACH, FL 33160-2209

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577 OCEAN BLVD.
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NAN BUSH
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GOLDEN BEACH, FL 33160-2211

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451 OCEAN BLVD.
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TURNBERRY OCEAN CLUB
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CITY OF MIAMI BEACH
1700 CONVENTION CENTER DRIVE
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CITY MANAGER
CITY OF MIAMI BEACH
1700 CONVENTION HALL CENTER
MIAMI BEACH FL 33139

CITY MANAGER
CITY OF SOUTH MIAMI
6130 SUNSET DRIVE
SOUTH MIAMI FL 33143

MAYOR
CITY OF SOUTH MIAMI
6130 SUNSET DRIVE
SOUTH MIAMI FL 33143

MAYOR
CITY OF MIAMI
3500 PAN AMERICAN DRIVE
MIAMI FL 33133

CITY MANAGER
CITY OF MIAMI
3500 PAN AMERICAN DR
MIAMI FL 33133

MAYOR
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NORTH MIAMI FL 33161

CITY MANAGER
CITY OF NORTH MIAMI BEACH
17011 NE 19 AVENUE
NORTH MIAMI BEACH FL 33162

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CITY OF KEY BISCAYNE
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KEY BISCAYNE FL 33149

MAYOR
VILLAGE OF KEY BISCAYNE
85 WEST MACINTYRE STREET
KEY BISCAYNE FL 33149

MAYOR
INDIAN CREEK VILLAGE
50 INDIAN CREEK ISLAND
INDIAN CREEK VILLAGE FL 33154

MAYOR
CITY OF MIAMI SHORES
10050 N E 2ND AVENUE
MIAMI SHORES FL 33138

MAYOR
CITY OF WEST MIAMI
901 S W 62ND AVENUE
WEST MIAMI FL 33144

MAYOR
TOWN OF GOLDEN BEACH
ONE GOLDEN BEACH DR
GOLDEN BEACH FL 33160

TOWN MANAGER
TOWN OF GOLDEN BEACH
ONE GOLDEN BEACH DRIVE
GOLDEN BEACH FL 33160

TOWN MANAGER
TOWN OF SURFSIDE
9293 HARDING AVENUE
SURFSIDE FL 33154

MAYOR
TOWN OF SURFSIDE
9293 HARDING AVENUE
SURFSIDE FL 33154

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VILLAGE OF BAL HARBOUR
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BAL HARBOUR FL 33154

MAYOR
VILLAGE OF BAL HARBOR
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BAL HARBOR FL 33154

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BAY HARBOR ISLAND FL 331543

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BAY HARBOR ISLAND FL 33154

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NORTH BAY VILLAGE FL 33141

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FLORIDA SHORE AND BEACH PRES. ASSOC.
2952 WELLINGTON CIRCLE
TALLAHASSEE FL 32308

JOHN SZELIGOWSKI
TAMS CONSULTANTS
655 3RD AVENUE
NEW YORK NY 10017

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THE HONORABLE CONNIE MACK
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U S HOUSE OF REPRESENTATIVES
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THE HONORABLE ILENA ROS-LEHTINEN
U S HOUSE OF REPRESENTATIVES
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10100 PINES BOULEVARD
PEMBROKE PINES FL 33025

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HONORABLE GUSTAVO BARREIRO
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HONORABLE JOHN F COSGROVE
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APPENDIX D

GEOTECHNICAL INFORMATION

BAKERS HAULOVER INLET EBB SHOAL BORROW AREA

MEMORANDUM FOR RECORD

SUBJECT: Dade County SPP, 2nd Renourishment, Bakers Haulover Inlet Ebb Shoal Borrow Area.

1. Bakers Haulover Inlet Ebb Shoal Borrow Area is 2000 feet offshore and just northeast of Bakers Haulover Inlet. The borrow area is located in 10 to 20 feet of water.
2. The borrow area occupies approximately half of Bakers Haulover Inlet ebb shoal. The final design was selected to leave a shoal and resulting wave refraction to minimize the impact to the adjacent shore processes. The shoal seems to be anchored on its north end by shallow rock at the location of core boring CB-ND-49, two feet below the sand surface. No excavation is to be performed in this area, and the remaining shoal will still be anchored by this shallow rock.
3. The hardgrounds east of the Bakers Haulover Inlet Ebb Shoal Borrow Area were mapped using high resolution side scan sonar for the Coast of Florida Study. The results of the remote sensing survey were ground truthed by Corps of Engineers, DERM and U.S. Fish and Wildlife biologist divers. No hardgrounds were located within the borrow area, and no hardgrounds occur within 500 feet of the eastern tip of the borrow area.
4. The permit limits of the borrow area extend 50 feet beyond the construction limits of the borrow area.
5. The excavation elevation shown on the drawings is a minimum of 2 feet above undesirable material.
5. The material to be excavated is generally light gray to tan, poorly graded shelly sand with a trace of silt and gravel sized shell fragments. The silt content is shown in the table below.

PERCENT SILT

Sieve Size	200 Sieve 0.074 mm	230 Sieve 0.063 mm
Range	0.2 - 13.3%	0.2 - 12.3%
Average	2.7 %	2.4 %

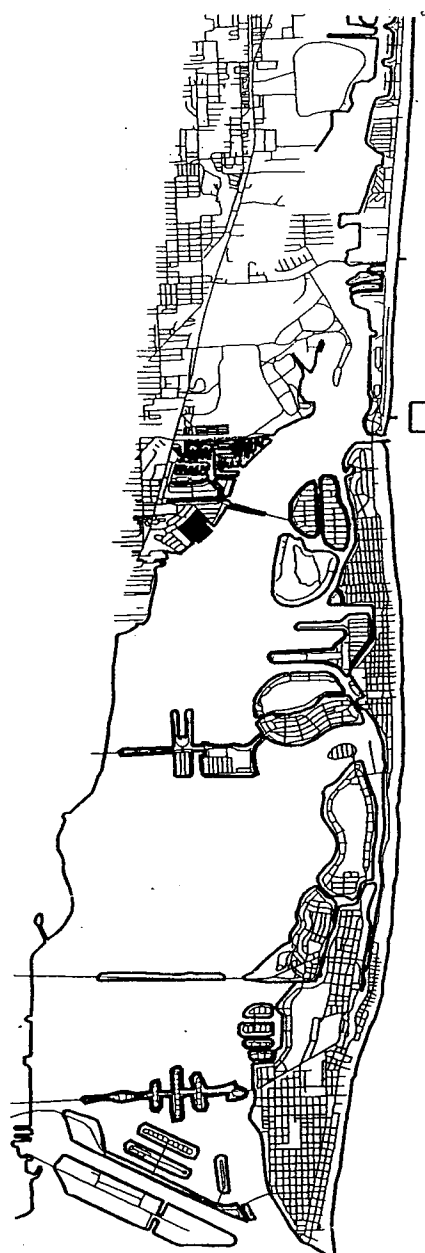
6. The composite mean grain size of the borrow area is 0.89 phi (0.54 mm) with a phi standard deviation of 1.09 phi. Using Bakers Haulover Inlet Ebb Shoal Borrow Area for Bal Harbor beach nourishment would require an overfill ratio (R_a) of 1.0 with a renourishment factor (R_j) of 0.49. This borrow material represents

a high quality beach nourishment sand source with a very low silt content.

7. Carbonate rock fragment **do not** occur within this borrow area. Rock removal will not be required.

8. Enclosed are maps of the Bakers Haulover Inlet Ebb Shoal Borrow Area showing location and construction limits, table of laboratory results of the borrow area only, composite sample statistics and composite frequency and cumulative gradation curve plots. Detail maps, laboratory data and core boring logs have been previously provided.

Doug Rosen, PG



Sunny Isles

Haulover Beach
Park

▶ Bakers Haulover Inlet
Ebb Shoal Borrow Area

Bal Harbour

Surfside

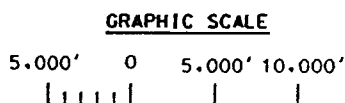
Miami Beach

▬ ROCK
DISPOSAL
AREA

Government
Cut

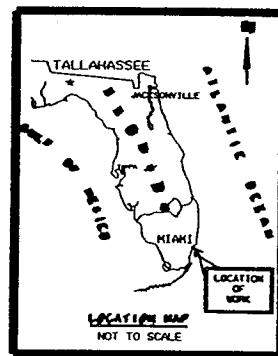
A T L A N T I C O C E A N

LOCATION MAP



▶ BORROW AREA
SGC-2

▶ BORROW AREA
SGC EXTENSION



US ARMY CORPS
OF ENGINEERS
JACKSONVILLE DISTRICT

DADE COUNTY SHORE PROTECTION PROJECT
PROJECT MODIFICATION, SUNNY ISLES

LOCATION MAP

SCALE: AS SHOWN

CESAJ-EN-GG

DATE:

SHEET NO.:

DADE Co. Borrow Area BHIES																
Test results from samples above design grade ONLY.																
See sheet B for all test results.																

Calculation of Composite Grain Size Distributions

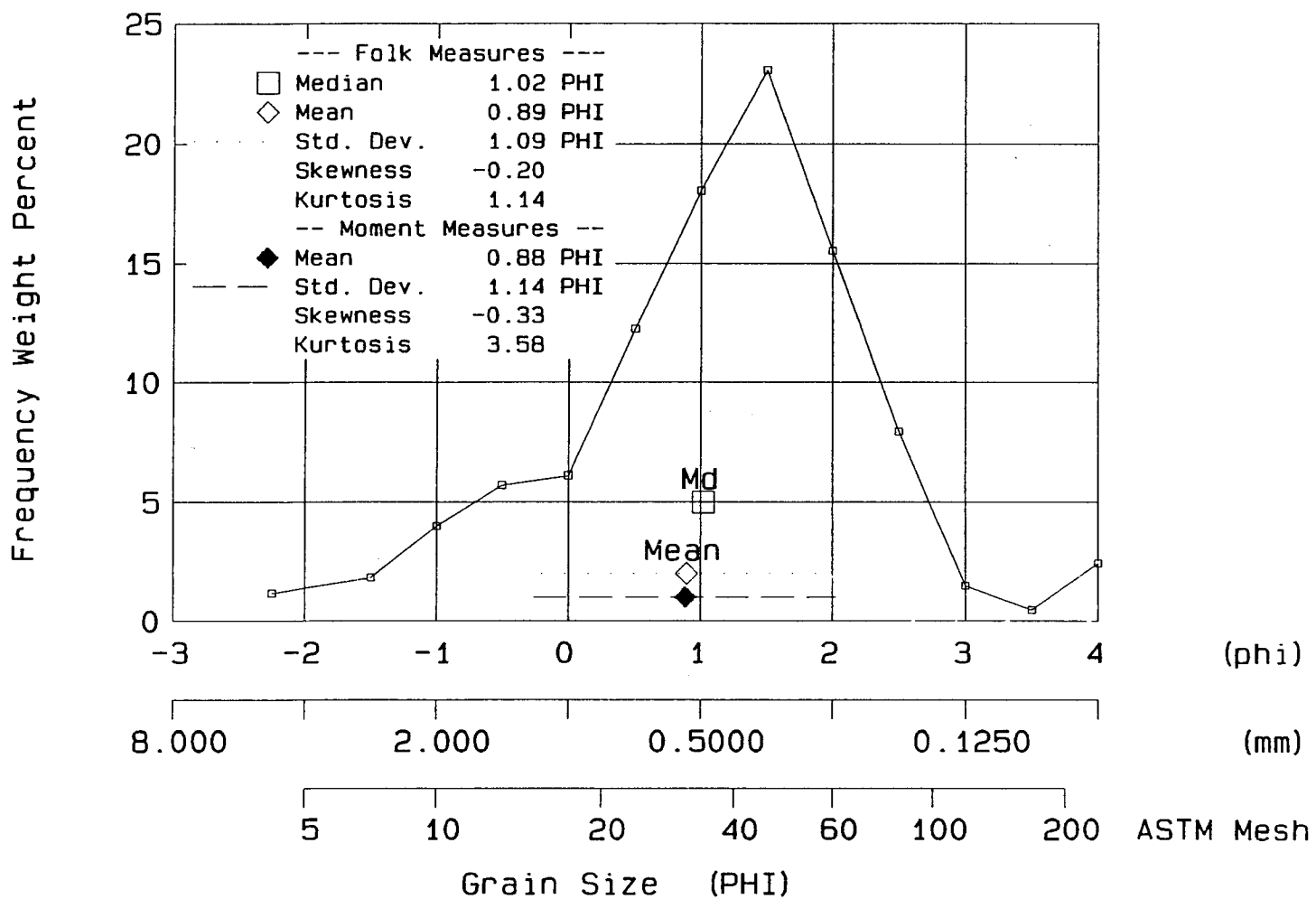
SIZE CLASSIFICATION:	Gravel	-----	Sand	-----	Silt	Clay
(By Weight Percent)			Coarse	Medium	Fine	
Wentworth	6.98	42.10	38.61	12.31	0.00	0.00
Unified	1.17	5.81	42.10	48.49	2.43	0.00

STANDARD STATISTICS:	Method of Moments	Folk	Graphic Measures	Grain Size
Median Diameter			1.02 phi	0.493mm
Mean Diameter	0.88 phi		0.89 phi	0.543mm
Standard Deviation	1.14 phi		1.09 phi	
Skewness	-0.33		-0.20	
Kurtosis	3.58		1.14	

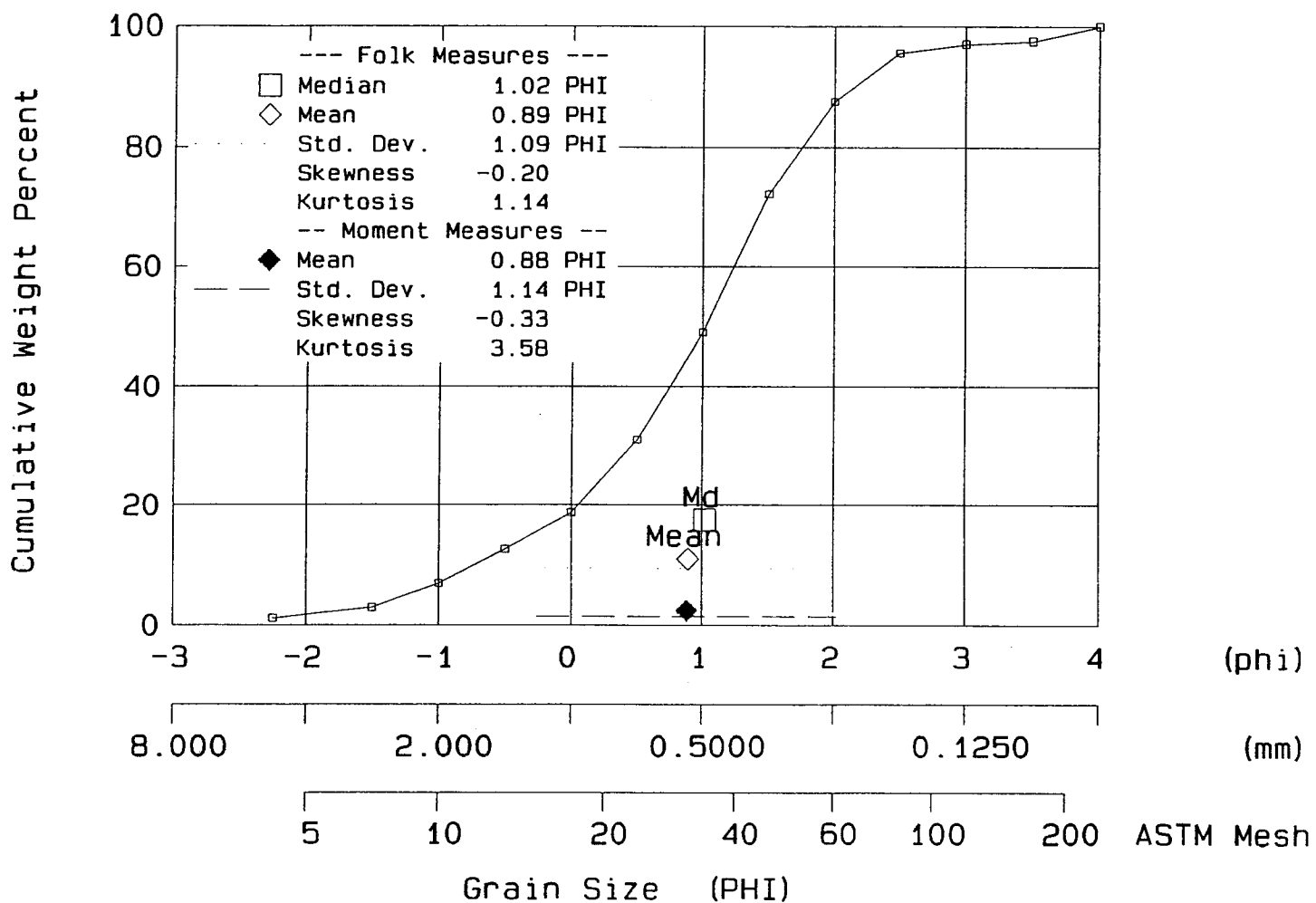
Composite	Title	Date Analyzed
BHIES	Dade Co. Spp, Bakers Haulover Inlet Ebb Shoal B/	09/11/97
Analyzer	Comment	Cum Weight %
DSR	Samples Within Design Grade	100.00
Type of Samples	Samples in Composite	Top of Composite
	1	0.000 feet
		Bottom of Composite
		0.000 feet

ASTM	MM	PHI	Weight	ASTM	MM	PHI	Weight	ASTM	MM	PHI	Weight
Mesh	Size	Size	(%)	Mesh	Size	Size	(%)	Mesh	Size	Size	(%)
4.00	4.76	-2.25	1.170	25.00	0.71	0.50	12.250	80.00	0.177	2.50	7.930
7.00	2.83	-1.50	1.820	35.00	0.50	1.00	18.050	120.0	0.125	3.00	1.480
10.00	2.00	-1.00	3.990	45.00	0.35	1.50	23.080	170.0	0.088	3.5	0.470
14.00	1.41	-0.50	5.700	60.00	0.25	2.00	15.530	230.0	.0625	4.00	2.430
18.00	1.00	0.00	6.100								

Dade Co. Spp. Bakers Haulover Inlet Ebb Shoal B/
Composite: BHIES



Dade Co. Spp. Bakers Haulover Inlet Ebb Shoal B/
Composite: BHIES



APPENDIX E

PHYSICAL AND BIOLOGICAL MONITORING PROGRAM

***** DRAFT *****

Miami-Dade Co. Haulover Renourishment Monitoring Plan

April 30, 2002 Pg. 1

**HAULOVER BEACH RENOURISHMENT;
MIAMI-DADE COUNTY EROSION CONTROL PROJECT**

**Physical and Biological Monitoring Program For Miami-Dade County, Florida,
Beach Erosion Control And Hurricane Protection:
BAL HARBOR/HAULOVER BEACH RENOURISHMENT**

Submitted by
Miami-Dade County Department of Environmental Resources Management

as partial fulfillment of special provisions of the
U.S. ARMY CORPS OF ENGINEERS PLANS AND SPECIFICATION

and special conditions of
FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION (FDEP)
Joint Coastal Permit # 0126527-001-JC

MONITORING PROGRAM COMPONENT OUTLINE

I. BIOLOGICAL MONITORING.

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- I.2 Monitoring Frequency.
- I.3 Sampling Regime and procedures.
 - I.3.1 Quantitative Biological Surveys.
 - I.3.2 Qualitative Surveys.

II. SEDIMENT AND SEDIMENTATION MONITORING.

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- II.2 Reef Sediment Accumulation Surveys.
- II.3 Indicators Of Impending Or Imminent Sediment Impacts.
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III. VISUAL SURVEYS OF HABITATS ADJACENT TO THE BORROW AREA

- III.1

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- IV.1

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V. SEA TURTLE MONITORING AND NEST RELOCATION PROGRAM.

- VI.1 Daily Beach Surveys For Nesting Activities.
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DESCRIPTION OF MONITORING COMPONENTS

I.0. BIOLOGICAL MONITORING. The biological monitoring will utilize a BACI (Before-After-Control-Impact) Design. This design establishes Monitoring stations with randomly selected sites within an area of probable impact, and in areas of similar habitat outside the region of possible impact, for comparisons prior to and after conduct of the project. The inclusion of the "control" locations allows for correction of differences noted in the pre/post evaluations, for variations or differences that were not specifically associated with the project (i.e., storm effects, regional habitat disruptions).

I.1 MONITORING STATIONS. Minimally three biological monitoring stations will be established for this project. Two will be adjacent to, and one distant from, the borrow area. The sand source (borrow area) to be used for this project is located just north of the Haulover jetty (Figure 1) in approximately 15 to 30 feet of water. Extensive north/south expanses of hardbottom reefs occur in the general region of the borrow source. Continuous hardbottom reef areas are located approximately 700' to the east of the borrow area, and small isolated patch reefs and low-density soft coral and sponge (LD SC/Sp) habitat are found 350' east of the borrow area as well. Borrow area monitoring station location will be selected based on the neighboring hardground reef lines or significant habitat and known local current patterns, so that selected sites will represent the anticipated areas with highest probability of impact (relative to distance and current direction).

- A. A minimum of three stations will be established adjacent to the borrow area. Two "reference" or comparison stations will be positioned minimally 5 miles south of the borrow area in areas with similar water depths and based on qualitative assessment, show similar composition and densities of biological community components. Each station will be set (marked) by fixing a randomly selected "Station Reference Point" on the reef edge.
- B. Each Station will be comprised of five randomly placed 2.1 m X 2.0 m quadrats (total sample area of 21.0 m²/site) for determination of benthic community components. The quadrat location will allow for determination of any impacts across the entire reef tract.
 - a. The location of each of the quadrats will be determined by randomly choosing a distance and direction from the reference point (max distance = 100 m or one-half the width of the reef at the reference point, whichever is less).
 - b. Each quadrat will be oriented normal to the prevailing direction of the reef tract (i.e., N/S), marked with an iron bar, and all have corner points marked with stainless steel pins to allow precise relocation.
 - i. Each quadrat will be subdivided into six 1.0 m X 0.7 meter subplots, to aid in photogrammetric analysis of the quadrat.
 - ii. Each subplot will be marked with stainless steel pins to allow precise relocation.

I.2. MONITORING FREQUENCY. The sampling frequency for each monitoring task is summarized in Table 1. Each site will be visited quarterly for complete quantitative or qualitative photographic surveys.

- A. Quantitative assessments will be conducted minimally once prior to, once immediately after completion of project construction and every six months thereafter for a minimum of two years.
- B. Qualitative assessments will be conducted three months after the post construction quantitative survey, and every six months thereafter until completion of the monitoring program.

I.3. *SAMPLING REGIME AND PROCEDURES.* The quantitative and qualitative sampling procedures and techniques are described below.

I.3.1 Quantitative Biological Surveys of monitoring stations will occur once prior to construction, once immediately following and every six months thereafter.

- A. Benthic community structure will be quantitatively evaluated at each monitoring station using a photogrammetric technique. The technique will include 35 mm digital photography and ground-truthing (mapping) of each station during each quantitative sampling.
 - 1. Density, frequency and diversity of hard-corals, soft corals, sponges, other noted benthic invertebrates and algae will be determined during quantitative surveys via mapping of 1.0 m X 0.7 m subplots of the 2.0 m X 2.1 m quadrats (six subplots per quadrat). All hard corals will be measured (major and minor axis) to allow determination of hard coral coverage.
 - 2. All photography and mapping will be conducted by qualified biologists utilizing SCUBA. All hard and soft corals, and common sponges and algae will be field identified to the lowest possible taxonomic rank. Voucher specimens may be taken, outside of the sampling quadrat, for unknown organisms and identified in the laboratory.
 - 3. Each subplot will be photographed using an underwater camera (i.e., Nikon 990 in a Ikelite housing) and strobe, mounted on a prefabricated "framer". The framer will hold and position the camera and strobe for optimal resolution of the subplot area. The photographs will be used to verify the percent of cover of hard corals. Further, the photographs will serve as documentation of the benthic community components within the subplots.
- B. Water Quality. Profiles of the water column will be conducted at each biological monitoring station, in 3 m depth increments (i.e., surface, 3 m, 6 m, 9 m, etc.), from the surface to the bottom for the parameters listed below. A single sampling assemblage consisting of a multi-sensor array, light sensor and water sampling tube, will be lowered into the water to insure simultaneous sampling of measured parameters and collection of water samples for laboratory analysis.
 - 1. Light levels will be measured using a Li-Cor® dual sensor array (one surface, one underwater sensor). Surface and at-depth photon flux densities will be recorded with a Li-Cor® LI-1000 datalogger. Light measurement units will be $\mu\text{E}/\text{m}^2/\text{s}$ (of PAR).
 - 2. Turbidity levels will be determined on samples collected during the Water Quality Profiling (minimally for the surface, mid depth and bottom samples). Samples will

be read on a laboratory calibrated Lamotte® portable turbidity meter (or equivalent) and recorded in NTU's (Nephelometric Turbidity Units).

3. Temperature, pH, salinity, dissolved oxygen and oxidation-reduction potential will be measured using a Hydrolab® "Surveyor-IV" multi-sensor data logger.
4. Nutrient levels (ammonia, organic nitrogen [NOx], and total phosphate) will be determined for the top, mid-level and bottom samples. Analysis will be conducted as per the D.E.R.M. Laboratory Comprehensive Quality Assurance Plan (FDEP Tracking # 870238G).

- C. Fish Populations of the hard-bottom habitats will be estimated via the Bohnsack and Bannerot (1986) Technique. A minimum of 6 replicates per station will be used to estimate the species composition, abundance and biomass of the fish population.

I.3.2 Qualitative Surveys of biological monitoring stations (Three months post-construction and every six months thereafter).

- A. Visual surveys and photographic documentation. Each station will be assessed visually for any abnormal or unusual characteristics. Each of the five quadrats at each station will be photographed using the techniques as described for the quantitative surveys, to document the interim status of the monitoring sites. Ground-truthing of the sites will not be conducted during these surveys, however, divers will note any obvious alterations or changes in the general hard-bottom habitat.
- B. Water Quality. Light penetration and water quality profiles, as described for the quantitative sampling, will be conducted during the Qualitative Survey period.

II. SEDIMENTATION AND SEDIMENT MONITORING.

II.1 *SEDIMENT DEPOSITION RATES* The comparative rates of sediment deposition on hard-bottoms adjacent to the borrow area and comparison sites will be assessed on a quarterly bases.

- A. Relative sediment deposition rates will be measured via sediment traps located at the reef edge proximal to the borrow area. Minimally triplicate traps will be used to estimate the relative sediment "fallout" from the water column. The traps will sample 0.5 m above the reef bottom.
- B. A minimum of five sediment deposition stations will be established. A sediment collection array will be placed at the following locations (Figure 1):
 1. On the reef adjacent to the biological monitoring stations located midway along the borrow area (minimum of 2 stations).
 2. 0.25 mile north of the northern limit of the borrow area.
 3. 0.25 mile south of the southern limit of the borrow area.
 4. On the reef adjacent to the biological monitoring control station.

C. Sediment arrays will be collected as described below to determine deposition rates. Rates will be expressed in milligrams sediment per square-centimeter per day ($\text{mg}/\text{cm}^2/\text{day}$).

1. During Construction
 - a. During periods with no indications of sediment stress on the hardgrounds, samples will be collected biweekly.
 - b. During periods with any level of sediment stress, samples will be collected weekly.
2. Pre-/Post-Construction. Samples will be collected during quantitative and qualitative samplings (i.e., quarterly).

II.2 REEF SEDIMENT DEPTH/ACCUMULATION. The depth of sediment on the reef areas will be measured at, and adjacent to the fixed sediment deposition stations. Reef sediment depth measures will be recorded at fixed stations and from random measures taken in the area around the sediment deposition arrays.

- A. At each monitoring site the sediment depth will be assessed by three means.
 1. Random Measures. At each sediment deposition station, 15 random measures of the sediment depth will be taken on the reef surface during each assessment in the immediate area of the fixed station (measurements will exclude crevasses, depressions and gullies). Measures will be made with a ruler graduated in mm. Measures will be recorded to the nearest mm.
 2. Biological Monitoring Station Sub-quadrat Measures (semi-annual). At each biological monitoring station quadrat, a measure of the sediment depth will be taken at the corners of each sub-quadrat. Measures will be made with a ruler graduated in mm. Measurements will be recorded to the nearest mm.
- B. During the construction phase each station will be visited minimally on a weekly basis. If excessive levels are detected (See Sections II.3 and II.4), assessments of sediment levels will be conducted no less than 2 times a week until the sediment levels return to acceptable levels.
- C. The random measures will be averaged and, along with the fixed station measures, compared to previous sampling levels to determine accumulation rates. Measures taken at the biological stations will be used to correlate sediment levels with any documented biotic community changes.

II.3 INDICATORS OF IMPENDING OR IMMINENT SEDIMENT IMPACTS. Possible or imminent sediment impacts refer to identification of conditions or observations that indicate benthic organisms are being, or have been stressed by factors other than natural events. Thus, indications of possible impact will be based on comparative observations between borrow area locations and the "control" or comparison sites. In the event that an indication(s) of pending or imminent impact to benthic community components are documented during the construction surveys, the FDEP and the ACOE will be notified immediately of the possibility of violation of sediment levels on the reefs. Notification will be by phone, radio, e-mail or fax, and followed by a written report to be submitted within 24 hours, or on the next work day if the indicators are noted on a weekend or holiday. Indicators of possible of imminent impact include but are not limited to:

- A. Standing sediment on hard corals, soft corals, sponge or other organisms that is not removed by normal currents or wave action.
- B. Excessive mucus on hard corals, without indications of bleaching.
- C. Excessively extruded polyps (e.g., sediment removal process).
- D. Mottling of color of benthic organisms (soft corals, algae, sponges, etc).

II.4 *SEDIMENTATION VIOLATIONS*. In the event that irreversible impacts (i.e., organism or organism tissue death) to benthic community components are documented during the construction phase surveys, the FDEP and the ACOE will be notified immediately of the possibility of a violation of sediment levels on the reefs and impact to the benthic reef community. Notification will be by phone, radio, e-mail or fax, and followed by a written report to be submitted within 24 hours, or on the next working day. Should a violation be noted on a weekend or holiday, DERM will attempt to notify the ACOE Project Engineer and the FDEP "on-call" officer (if one is so designated). If no FDEP, "on-call" officer is designated, then notification will be given as soon as possible on the next business day. A violation will be defined as a significant build-up of sediment sufficient to cause any one or more of the following conditions:

- A. A frequency of observed bleaching (partial or complete) of hard coral colonies, significantly above the level found at the control stations.
- B. Excessive mucus produced by hard corals to remove sediment from their surface, resulting in binding of sediments and transport of bound sediments off the coral's surface and subsequent accumulation of the sediments at the base of the coral head. Such accumulations have been seen to initiate a "self burial" process, causing death of the lower tissue of the coral head.
- C. Covering of benthic community components (i.e., sponge, algae) by sediment for sufficient time or sufficient sediment so as to note death or degradation (i.e., bleaching, pigmentation changes) of the underlying organisms.

If a violation is found, DERM will initiate an assessment to determine the extent of impact to biological communities. DERM will monitor the sediment level after a violation, minimally twice a week to determine the point in time when the sediment level has decreased to within 0.5 cm from initial datum.

Any biological impact assessment will focus around the information in hand from DERM's Biological Monitoring Stations which are adjacent to the borrow area. Other sites can be added if it appears that the impact is significantly greater in areas distant to the existing biological monitoring stations.

III. VISUAL SURVEYS OF HABITATS ADJACENT TO THE BORROW AREA .

III.1. VISUAL SURVEYS OF HARDBOTTOM REEFS AND SIGNIFICANT HABITAT ADJACENT TO THE BORROW AREA. Visual assessment of the condition and status of the benthic community has been found to be the best method for eliminating or minimizing impact to the reef community. Visual surveys of hardground and significant habitat adjacent to the borrow area will be conducted minimally on a semi-weekly (twice weekly) basis. During the survey, a qualified biologist using scuba, and assisted with diver propulsion vehicles, will visually inspect these areas that are adjacent to the borrow area. The biologist will note the general level of sediment and watch for indications sediment impact, as described above.

- A. At least one of the weekly surveys will be conducted by a DERM biologist with a degree in Marine Biology or related field and minimum of 5 years experience in impact characterization and assessment.
- B. The second weekly survey may be conducted by a qualified DERM biologist with knowledge and experience in marine organism identification and benthic monitoring of the offshore reef areas.
- C. Surveys of the hardground areas will be incorporated into the sedimentation monitoring as described in Section II of this plan.

IV. DREDGE SLURRY PIPELINE CORRIDOR HARD CORAL PROTECTION.

IV.1 HARD CORAL PROTECTION MEASURES. The dredge slurry pipeline corridor is over sand throughout it's length from the borrow area to the fill zone. Due to this fact, hard coral protection and impact assessment will not be required for this project.

V. BEACH FILL COMPACTION AND SEDIMENT ANALYSIS.

V.1. COMPACTION MONITORING. Compaction monitoring of the in-place beach fill will be conducted in accordance with the permit conditions timeline. A cone penetrometer, equivalent to that used by Nelson (1988) will be used for each assessment. Based on the results of the penetrometer analysis, the beach areas will be tilled to a depth of 36 inches prior to the start of each turtle nesting season during the period of this monitoring plan. The FDEP and the U.S. Fish and Wildlife Service will be consulted when the tilling criteria given in Section V.B. are present.

- A. Penetrometer analysis of the beach fill areas will be conducted along lines perpendicular to the shoreline, at 500 foot intervals, throughout the length of the beach fill segments.
 - 1. Two stations per line will be established with the first station one-third the distance between the dune (or seawall) and the mean high water line, and the second station two-thirds the distance between the dune (or seawall) and the mean high water line.
 - 2. Triplicate readings will be made at three depths (6, 12 and 18 inches) at each station.
- B. Tilling Criteria. Tilling of the beach fill will occur at the following times:
 - 1. Along the entire length of filled beach following completion of the placement and grading of fill material, and

Tilling will occur along those segments of the beach where adjacent sampling lines have cone penetrometer readings exceeding 500 CPU (cone penetrometer units), at the same depth.

V.2 *WEEKLY GRAIN SIZE ANALYSIS OF BEACH FILL.* Grab samples of beach fill will be collected weekly for grain size analysis. Three samples will be collected along the length of beach on which fill was placed during the preceding week. All samples will be dry sifted with a minimum of six standard sized screens. All procedures will follow ASTM procedures for "dry" determination of grain size.

VI. SEA TURTLE MONITORING.

The Sea Turtle monitoring may be subcontracted during construction by the selected contractor, however, Dade County D.E.R.M. will ensure that Sea Turtle Monitoring is conducted in a manner which meets the criteria and conditions established in the above referenced permits and existing FDEP Protected Species permit.

VI.1 *DAILY BEACH SURVEYS FOR NESTING ACTIVITIES.* If the beach nourishment project will be conducted during the marine turtle nesting season (May 1 through October 30), daily early morning surveys for sea turtle nests shall occur beginning May 1 or 65 days prior to project initiation (whichever is later), and continue through September 30. The project area will be surveyed each morning to check for sea turtle nesting activity. These activities will be conducted by an individual approved and permitted by the FDEP for such activities. As per special condition in the FDEP Protected Species Permit for Miami-Dade County beaches, all nests found on Miami-Dade County beaches are relocated into a protective hatchery. Mr. Jim Hoover (Miami-Dade Parks and Recreation Dept.- Haulover Park) is the FDEP permitted sea turtle monitor for all of Dade County (excluding Golden Beach and Virginia Key) and manages the county's sea turtle hatchery and nest relocation program. The contractor will contact and coordinate all sea turtle monitoring needs and requirements with the permitted individual.

- A. All nest surveys and egg relocations shall only be conducted by personnel with prior experience and training in nest survey and egg relocation procedures and duly authorized to conduct such activities through a valid permit issued by the Department.
- B. Relocations will be conducted prior to 9 AM each day. Construction activity shall not occur in any location prior to the completion of necessary sea turtle protection measures.
- C. Report on all nesting activity and marine turtle protection measures taken during construction shall be provided for the initial nesting season following the completion of construction and for a minimum of three additional nesting seasons. Monitoring shall include daily surveys and additional measures for sea turtle protection authorized by the Department. Reports shall be submitted to the Department no later than 30 days after completion of all monitoring activities, and shall include daily report sheets showing all activity including nesting success rates, hatching success of all relocated nests, dates of construction, and names of all personnel involved in nest surveys and relocation. All such personnel shall be qualified as noted above.

VI.3 *ESCARPMENT LEVELING.* Visual surveys for escarpments along the project area will be made immediately after completion of the beach nourishment project, and prior to May 1 for three

consecutive years. Results of the surveys shall be faxed to the Bureau of Protected Species Management (850) 921-4369, prior to any action being taken. Escarpments that interfere with sea turtle nesting or measuring 18 inches high or higher and 100 feet long or longer will be leveled to the natural contour within 24 hours of their discovery. The Department shall be contacted immediately if subsequent reformation of the escarpments that can interfere with sea turtle nesting or that exceed 18" in height for greater than 100' occurs during the nesting and hatching season to determine the appropriate action to be taken. An annual report summarizing escarpment surveys and corrective action taken shall be submitted to the Department and the Service.

VI.4 *NOTIFICATION*. If an unmarked sea turtle nest or a dead, injured, or sick turtle is discovered during construction activities the sea turtle permit holder and the Bureau of Protected Species Management will be notified immediately such that appropriate conservation measures can be taken.

VII. HYDROGRAPHIC MONITORING PLAN.

VII.1. *SCOPE OF THE PLAN*: This is presented to document Miami-Dade County's comprehensive, long-term monitoring plan for assessment of the performance of the Dade County Beach Erosion Control and Hurricane Surge Protection Project, inclusive of the 10.5 miles of Beach restored from 1975 to 1982, 2.5 miles of Sunny Isles Beach restored in 1988 and segments of Key Biscayne (approximately from reference monument DA-R7 through DA-R113).

VII.2. MONITORING PLAN OBJECTIVES:

- A. Insure a spatially and temporally consistent beach survey program on an annual basis over the full length of the Dade County Beach Erosion Control and Hurricane Surge Protection Project.
- B. Establish a comprehensive beach profile database, which will provide for easy data access and will be compatible with all existing State and federal agency database and GIS applications.
- C. Provide greater flexibility than the current project-specific survey schedule to allow for the assessment of acute erosion events due to storms or other causes.

VII.3. MONITORING PLAN COMPONENTS:

- A. Annual Project Surveys. This component will consist of project-wide profile surveys at approximately 1000 ft intervals extending from the north Dade County line to the southern tip of Key Biscayne, inclusive of Golden Beach, Fisher Island, and Virginia Key. Survey profiles will be referenced to specific monuments (DNR Reference Monuments R1 – R113). The profiles will extend from a position landward of the monument sufficient to include existing dune features or other topographic features located on the beach proper out to a

distance of 2,500 feet seaward, or closer, whichever is greater. Elevations will be determined minimally at 25 ft intervals along the full length of the profile. In addition, 1":300' controlled aerial photographs will be provided of the coast over the entire project length and provided to FDEP in a reproducible format.

- B Project Specific Monitoring of Haulover beach fill area. New renourishment sites along the project length will have additional interim surveys, which will be conducted midway between the annual surveys for a period of time in accordance with the permit conditions, to better assess fill adjustment and project performance.
- C Post Storm Monitoring. Surveys will be conducted to assess the erosional effects of major storms or other acute erosion events. The timing and extent of these surveys will be determined jointly by Dade County, FDEP and the Corps of Engineers. These surveys would serve to complement, not duplicate, any storm effects assessments that may be underway by other agencies.
- D Erosion Triggers and Mitigation of Adverse Impacts. Prior to the Department issuing a Notice to Proceed, the county shall provide a plan proposing criteria by which potential adverse shoreline impacts shall be evaluated and mitigated, including specific thresholds which will trigger mitigation of adverse impacts. The mitigation plan shall include time frames for evaluating impacts, along with specific mitigation actions, up to and including the removal of the breakwater structures.

VIII. REPORTING OF MONITORING DATA AND RESULTS

VIII.1 *BIOLOGICAL MONITORING AND SEDIMENTATION RATES*. Dade County DERM will submit semi-annual descriptive summary reports of the biological monitoring conducted for that period. Such reports will provide:

1. Date and personnel conducting the monitoring.
2. A descriptive summary of the monitoring conducted.
3. Any deviations from the prescribed monitoring program.
4. Available reduced data for that quarterly monitoring.
5. Any data not previously submitted for prior reporting periods.

VIII.2 *SEDIMENT ACCUMULATION AND SEDIMENT COMPACTION*. Reports of the sediment levels on the hardbottom areas adjacent to the borrow area will be submitted on a bi-weekly basis during the construction phase of the project. The report will include:

1. Date, time and personnel conducting the survey,
2. A descriptive summary of the sediment conditions on the hardbottom adjacent to the borrow area and the general health status of the benthic communities in the region as it relates to sedimentation.
3. A map of the borrow area and adjacent hardbottoms showing:
 - a. The location of the fixed sediment stations and the areas of hardbottom surveyed,

- b. location and depth of any elevated levels of sediment on the hardbottom.

If indications of impacts (as described in Section III. above) are documented, the FDEP will be notified immediately by phone or fax, and a report will be forwarded within 24 hours.

VIII.3 *BEACH FILL COMPACTION*. Measures of the beach fill compaction will be submitted quartile with the descriptive summary report for the biological monitoring.

VIII.4 *BEACH FILL SEDIMENT ANALYSIS*. Reports on the grain size analysis of material placed on the beach will be forwarded to the FDEP within one week of sampling. Reports will include:

1. Date, time and personnel conducting the survey.
2. A map of the segment of beach to be restored showing:
 - a. The location of the area filled during the specified week.
 - b. Locations from which the sediment samples were taken within that week's filled area.

VIII.5 *SEA TURTLE MONITORING*.

Reports detailing activities relative to the Sea Turtle monitoring and nest relocation activities will be forwarded to the FDEP:

1. Within 60 days of the completion of construction.
2. By December 31 of each year following construction.

VIII.6 *HYDROGRAPHIC PROFILES*.

1. Annual Reports. An annual report assessing the performance of the project over the prior year will be provided. The report will provide a discussion of erosion/accretion trends documented by the survey program for the entire project with a specific emphasis on recently renourished areas. Specific problem areas will be identified and possible solutions discussed.
2. Storm Monitoring Reports. A report detailing and analyzing the results from Post-Storm hydrographic monitoring conducted during the previous year will be submitted with the annual reports.
3. Data Format. Data will be provided to FDEP on 3.5" High Density diskettes within 14 days of the completion of survey activities and data compilation. DBASE IV files based on the FDEP developed MITS (Monument Information Tracking System) format will be utilized to allow direct compatibility with existing FDEP databases as well as those of the FDEP/Corps of Engineers Coast of Florida Study.

Table 1. Proposed Quarterly Biological and Sediment Monitoring Program sampling periodicity, conducted in association with the Haulover beach renourishment.*

PC-Q#	Photo.	G-T	Light Profile	Turb.	Water Quality	Sed. Meas.	Fish Surveys	Sand Compact	Grain size
Pre-Const.	X	X	X	X	X	X	X	X	X
Const.			X	X		X			X
Post- Const. (PC-Q1)	X	X	X	X	X	X	X	X	X
PC-Q2	X		X	X	X	X			
PC-Q3	X	X	X	X	X	X	X	X	
PC-Q4	X		X	X	X	X			
PC-Q5	X	X	X	X	X	X	X	X	
PC-Q6	X		X	X	X	X			
PC-Q7	X	X	X	X	X	X	X	X	
PC-Q8	X		X	X	X	X			

* Photo. = Benthic community station photography; G-T = Ground-truthing of photography; Sed. Meas. = Sedimentation deposition rate analysis and Sediment depth measures; Sand Comp. = Penetrometer compaction measures; Turb. = Turbidity; PC-Q# = Post-Construction quarter number.

Compaction tests (cone penetrometer) will be conducted after final grading of the beach fill, and at the beginning of each quarter thereafter for three years from the time of final grading.

Tilling of beach fill will be conducted on an "as needed" bases, when indicated by the compaction tests and after consultation with the FDEP and the U.S. Fish & Wildlife Service



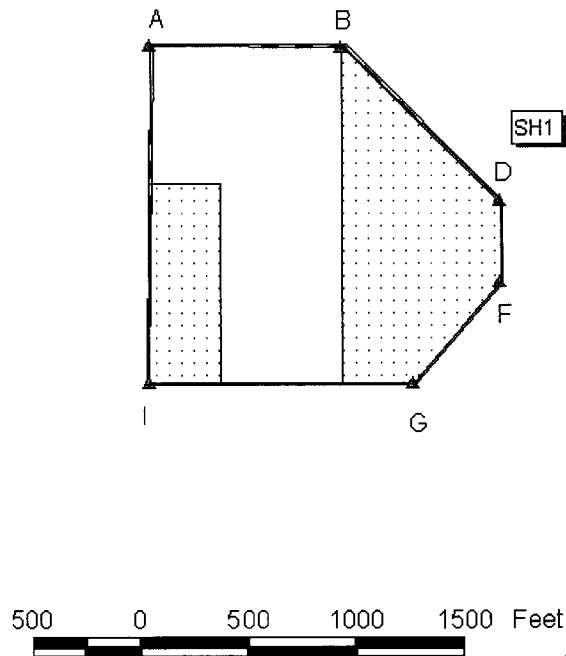
Haulover Renourishment Proposed Borrow Area Monitoring Sites



USACE Borrow Area Corner Points

- A) X=790,040 Y=572,310
- B) X=790,989 Y=572,309
- D) X=791,775 Y=571,539
- F) X=791,775 Y=571,139
- G) X=791,351 Y=570,633
- I) X=790,040 Y=570,633

Haulover Inlet



- ★ Proposed Monitoring Sites
- Reef Edge Trace
- Significant Habitat Trace
- Low Relief Reef (COFS '92)
- ▨ High Relief Reef (COFS '92)
- ~ Shoreline
- Dredge Boundary
- ▤ Proposed Dredge Area

Point	Easting	Northing
1RSN	792586	573641
SH1	792348	572117
1RBB	792444	571054
1RSS	792661	569320
1RBC	791938	544766



Note: Proposed monitoring sites 1RBB and 1RBC will be both sediment and biological monitoring stations. The remaining sites will be sediment monitoring stations only.

***** DRAFT *****

Figure 1. Location of the Borrow Area relative to the offshore hard-ground areas and approximate center points for the Benthic Community and Sediment Accumulation Monitoring Stations.